IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WISCONSIN

INGURAN, LLC, CYTONOME/ST, LLC, and XY, LLC,

Plaintiffs and Counter Defendants,

OPINION AND ORDER

v.

17-cv-446-wmc

ABS GLOBAL, INC., GENUS PLC, and PREMIUM GENETICS (UK) LTD,

Defendants and Counter Claimants.

This is the second of two opinions on the parties' cross-motions for claims construction and summary judgment in this patent lawsuit. As detailed in the court's prior order, plaintiffs Inguran, LLC, Cytonome/ST, LLC and XY, LLC, allege that the defendants ABS Global, Inc., Genus PLC and Premium Genetics (UK) Ltd, have infringed six patents, two owned by plaintiff XY and four owned by plaintiff Cytonome. In addition, all parties assert claims and counterclaims under state law. In this opinion and order, the court addresses the parties' arguments as to the four Cytonome patents, as well as plaintiffs' motion for summary judgment on defendants' counterclaims for inequitable conduct and breach of contract.

For the reasons that follow, the court will construe the "direction" terms in the Cytonome patents consistent with defendants' construction, requiring no overlap between the direction or directions implicated in the first step and the direction or directions implicated in the second step, but will adopt plaintiffs' position with respect to the term "focusing," construing that term to include the prosecution disclaimer requiring acceleration and to exclude the mere introducing of a sample fluid at a particular position

in a straight flow passage. As for the motions for summary judgment, the court will grant defendants' motion of noninfringement as to the '161 and '912 patents, finding that the only disclosed infringement theory for those patents fails to meet the direction limitation. The court will also grant, in part, defendants' motion of noninfringement as to the '476 and '309 patents, finding any infringement theory based on Detail B as the primary focusing or first step also fails to satisfy the direction limitation. Next, the court will also deny defendants' motion for summary judgment as to the three anticipation claims, finding disputed issues of material fact. For the same reason, the court will deny plaintiffs' motion for a finding in their favor on defendants' anticipation claims based on the prior art reference Tashiro. Finally, the court will deny plaintiffs' motion for summary judgment on defendants' counterclaims for inequitable conduct and breach of contract, finding material factual disputes as to each.

UNDISPUTED FACTS[1]

A. Patents-In-Suit

Plaintiff Cytonome asserts claims of infringement as to four of its patents: U.S. Patent Nos. 7,311476 ("the '476 patent"), 7,611,309 ("the '309 patent"), 8,529,161 ("the '161 patent"), and 9,446,912 ("the '912 patent"). (Dkt. ##1-1 to 1-4.) The parties refer to these four patents collectively as the "Cytonome patents." All four share the same title, "Multilayer Hydrodynamic Sheath Flow Structure," each name the same three inventors:

[1] The court also incorporates here the relevant facts from the prior summary judgment opinion and order.

John R. Gilbert, Manish Deshpande and Bernard Bunner, and they share a specification. Generally speaking, the Cytonome patents are directed to microscale devices and techniques for controlling the flow of particles and fluids in small channels, which is useful for flow cytometry and particle-sorting applications. The Cytonome patents all claim priority under the same provisional application, No. 60/516,033, filed on October 30, 2003, although plaintiffs assert an earlier date of invention of March 3, 2003.

Figure 1 of the '476 patent, as well as the other Cytonome patents, depicts a "sheath flow structure" (10):

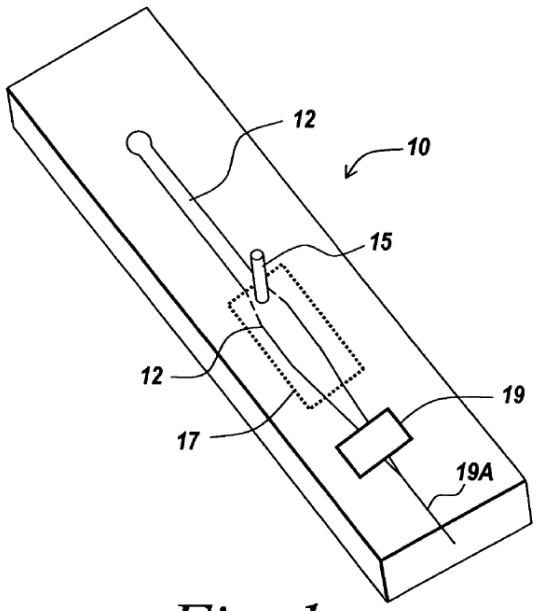


Fig. 1

('476 patent at Fig. 1.) "The sheath flow structure **10** includes a primary sheath flow channel **12** for conveying sheath fluid through the sheath flow channel **10**." (*Id.* at 4:38-40.) A sample inlet is identified as **15**. (*Id.* at 4:44.) The "primary focusing region" is identified as **17**, and the specification provides that this region "accelerates and focuses the sheath fluid around the injected sample." (*Id.* at 4:64-65.) A "second focusing region" is

disclosed at **19**, with 19A disclosing an outlet." (*Id.* at 4:67-5:1, 5:19.)

Plaintiffs propose several facts showing figures of the embodiments of the Cytonome patents, purportedly showing a "horizontally-tapered channel in two regions." (Pls.' Add'l PFOFs (dkt. #197) ¶ 97.) Defendants dispute this, pointing to Figure 4A, arguing that there is "no tapering in the secondary focusing region." (Defs.' Resp. to Pls.' Add'l PFOFs (dkt. #219) ¶ 97.) Figure 4A "is a perspective cross-sectional view of the sheath flow structure **100** illustrating the sheath fluid and suspending particle during the different stages of producing a sheath flow."

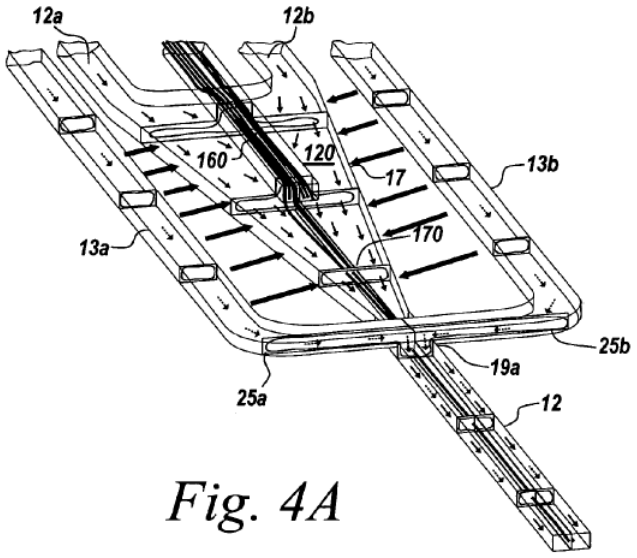


Fig. 4A

('476 patent at Fig. 4A.)

The asserted independent claims of the Cytonome patents contain the same or similar language involving a "direction" requirement or limitation that an action -- either focusing, injecting or adjusting -- occurs in "at least a first direction," and then at a second region, focusing, injecting or adjusting occurs in "at least a second direction different from

the first direction."[2] Moreover, three of the Cytonome patents -- the '476, '309, and '161 patents -- contain claims that require "focusing" of the sheath fluid around the particle or sample.

Claim 1 of the '476 patent requires:

> **1.** A sheath flow structure for suspending a particle in a sheath fluid, comprising:
>
> a primary sheath flow channel for conveying a sheath fluid;
>
> a sample inlet intersecting the primary sheath flow channel at a sample injection site for injecting a particle into the sheath fluid conveyed through the primary sheath flow channel;
>
> a primary focusing region extending downstream of the sample injection site for *focusing* the sheath fluid around the particle in *at least a first direction*; and
>
> a secondary focusing region provided downstream of the primary focusing region for *focusing* the sheath fluid around the particle in *at least a second* direction different from the first direction.

('476 patent at 11:9-23 (emphasis added).)

Claim 14 of the '309 patent provides:

> **14.** A method of surrounding a particle on at least two sides by a sheath fluid, comprising the steps of:
>
> conveying the sheath fluid through a primary sheath flow channel;
>
> injecting the particle into the sheath fluid conveyed through the primary sheath flow channel;
>
> *focusing* the sheath flow around the particle in *at least a first direction*; and
>
> *focusing* the sheath fluid around the particle in *at least a second direction different from the first direction*.

('309 patent at 12:27-37 (emphasis added).)

[2] As quoted below, the direction language in the '912 patent differs slightly, requiring "a first direction away from a first wall" and a "second direction away from a second wall." ('912 patent at 11:30-31, 35-36.)

Claim 1 of the '161 patent requires:

> **1.** A microfluidic system comprising:
> a primary flow channel for flowing a sample having one or more particles suspended in a suspension medium;
> a primary adjustment region including a first set of one or more inlets intersecting the primary flow channel and adapted for introducing additional suspension medium into the primary flow channel, whereby the sample is adjusted in *at least a first direction*; and
> a secondary adjustment region downstream of the primary alignment region and including a second set of one or more inlets intersecting the primary flow channel downstream of the first set of one or more inlets and adapted for introducing additional suspension medium whereby the sample is adjusted in *at least a second* direction different from the first direction.

('161 patent at 10:63-11:10.) For the '161 patent, some of the independent claims, such as claim 1 quoted above, "adjusting" is disclosed, rather than "focusing." The dependent claims, however, require "focusing." (*See, e.g.*, '161 patent, Claim 6 ("The system of claim **1**, wherein adjusting the sample in at least a first direction and adjusting the sample in at least a second direction includes *focusing* the sample." (emphasis added)).)

Finally, claim 1 of the '912 patent provides:

> **1.** A flow structure for suspending a particle in a sheath fluid, comprising:
> a primary flow channel provided within a substrate and configured to convey fluid in a downstream direction; and
> a sheath fluid distribution system including:
> a first sheath fluid channel in fluid communication with the primary flow channel at a first sheath fluid introduction region for injecting sheath fluid into the primary flow channel in *a first direction away from a first wall* of the primary flow channel; and
> a second sheath fluid channel in fluid communication with the primary flow channel at a second sheath fluid introduction region for injecting sheath fluid into the primary flow channel in *a second direction away from a*

second wall of the primary flow channel,

wherein the second sheath fluid introduction region is located downstream from the first sheath fluid introduction region, and

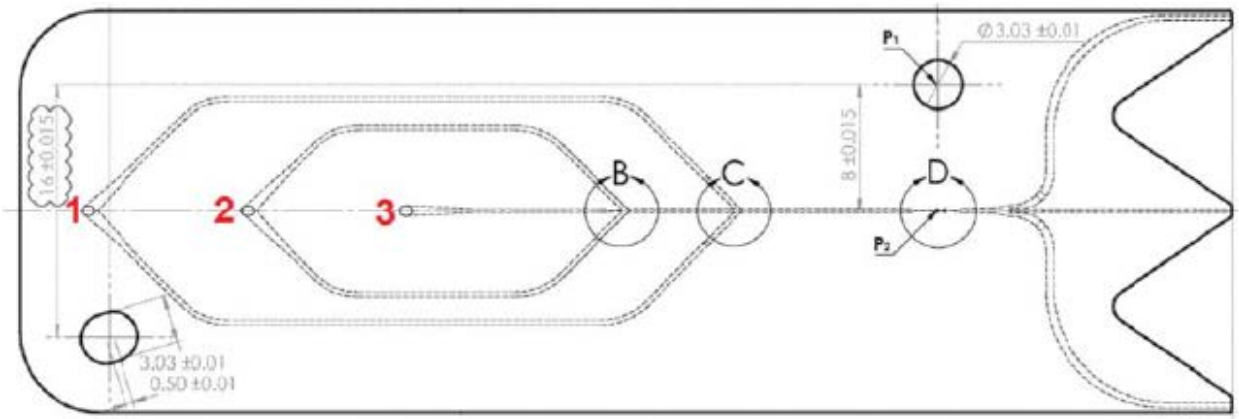
wherein a width of the primary flow channel at the first sheath fluid introduction region is greater than a width of the primary flow channel at the second sheath fluid introduction region.

('912 patent at 11:21-44.)

B. Accused Infringing Technology

Following entry of this court's injunction in *ABS I*, ABS launched its GSS technology in September 2017. Plaintiffs allege that the GSS technology (or chip) and another ABS technology, the single sheath chip, infringe their patents.[3] ABS contracts with fabricators who make the GSS chip and the single sheath chip. ABS also imports and uses both chips.

A top-view schematic of the GSS chip is depicted below:

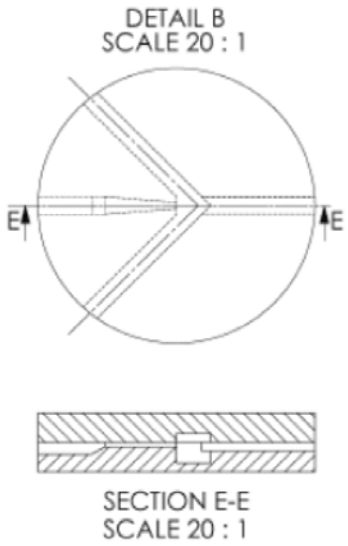


(Pls.' Add'l PFOFs (dkt. #197) ¶ 191.) Sheath fluid enters the chip through a sheath fluid

[3] There are two versions of the accused GSS chip, versions 1.0 and 1.1, but the differences between these versions are not material.

inlet (1) and flows to Detail C through branching channels. Sheath fluid also enters the chip through another sheath fluid inlet (2) and flows to Detail B through branching channels. Sample fluid enters the chip through sample fluid inlet (3) and flows to Detail B, where it is introduced to sheath fluid originating from inlet 2. Sample fluid and sheath fluid flow through Details B, C and D. The first focusing step is in the circled area marked as Detail B. The second focusing step takes place at Detail C. Additional focusing occurs at Detail D.

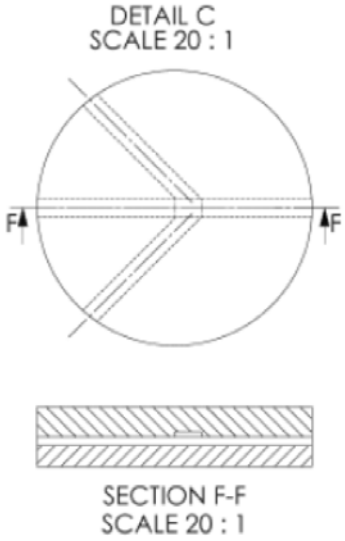
An enlarged version of Detail B is depicted below:



(*Id.* ¶ 230.) In Detail B, defendants contend that the GSS chip "focuses in all four directions (*i.e.*, away from the top, bottom, and sides of the channel)." (*Id.* ¶ 231.) Plaintiffs purportedly dispute this characterization, and instead represent that the GSS chip "focuses in a single radially inward direction." (Pls.' Resp. to Defs.' PFOFs (dkt. #196) ¶ 231; *see also* Pls.' Add'l PFOFs (dkt. #197) ¶ 217.) Since focusing away from external walls would appear to be the same as focusing radially inward, this dispute appears

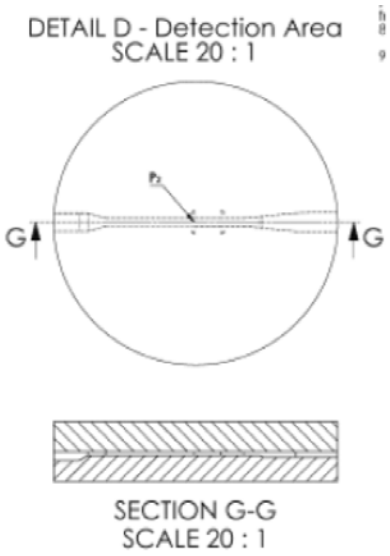
to be a distinction without a difference, as addressed further below. The parties also dispute whether the above depiction shows that "the channel tapers horizontally just after the point where the sample is introduced to the sheath fluid" -- plaintiffs' position -- or that the depiction simply shows "two subchannels coming together, not a taper" -- defendants' position. (Defs.' Resp. to Pls.' Add'l PFOFS (dkt. #219) ¶ 197.) The court also takes up this dispute below.

An enlarged view of Detail C is depicted below:



(Defs.' PFOFs (dkt. #161) ¶ 232.) In Detail C, the parties agree that the GSS chip focuses from above, away from the top wall, in a vertical direction to position the sample in the center of the flow for detection.

Finally, an enlarged view of Detail D is shown below:

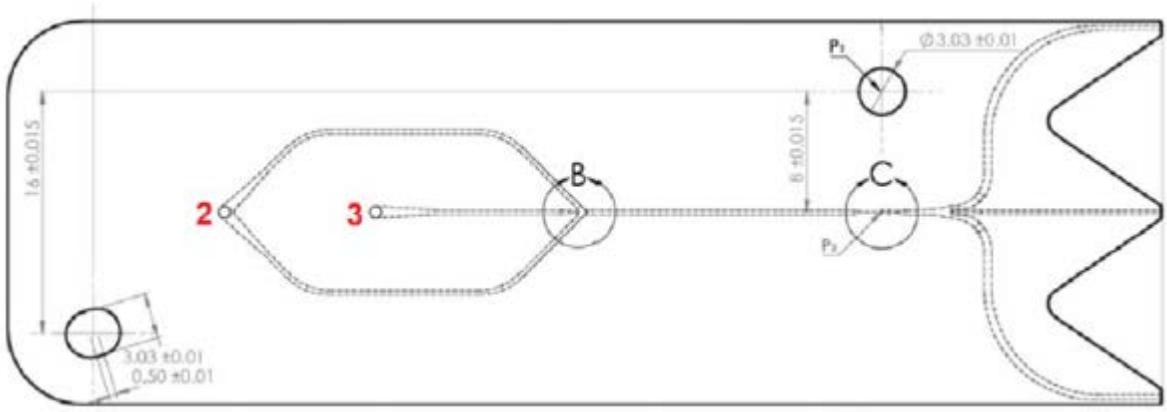


(*Id.* ¶ 234.) The parties dispute the proper characterization of Detail D. Defendants maintain that "the GSS chip employs a vertical ramp along the bottom wall and tapering along the left and right walls to increase the sample velocity just before the detection zone." (*Id.* ¶ 235.) However, plaintiffs assert that the ramp and taper are not a "single region." (Pls.' Resp. to Defs.' PFOFs (dkt. #196) ¶ 235; *see also* Pl.'s Add'l PFOFs (dkt. #197) ¶¶ 214-15.) The parties also dispute whether the *combined* ramp and taper focus in all four directions, as defendants contend, or "the horizontal taper in Detail D focuses away from the left and right-side walls and the vertical ramp in Detail D focuses away from the bottom wall," disputing that the ramp also focuses from the top, as plaintiffs contend. (Pls.' Resp. to Defs.' PFOFs (dkt. #196) ¶ 235; *see also* Pl.'s Add'l PFOFs (dkt. #197) ¶¶ 214-15.)

As set forth in part above, the asserted claims of the Cytonome patents all require two steps: (1) the introduction, adjustment or focusing of fluid "in at least a first direction" and (2) a second introduction, adjustment or focusing of fluid "in at least a second direction different from the first." (Defs.' PFOFs (dkt. #161) ¶¶ 241-44.) For the GSS chip, plaintiffs' expert describes infringement theories based on: (1) Detail B as the first

step and Detail C as the second step; (2) Detail B as the first step and Detail D (including both the ramp and taper regions) as the second step; (3) Detail C as the first step and Detail D (again including both the ramp and taper regions) as the second step; and (4) Detail D's ramp as the first step and Detail D's taper as the second step.

The accused single sheath chip, as depicted below, has essentially the same design as the GSS chip, but omits the second focusing region identified as Detail C in the GSS chip:



(Pls.' Add'l PFOFs (dkt. #197) ¶ 208.) Detail B in the single sheath chip is the same as Detail B in the GSS chip, while Detail C in the ingle sheath chip corresponds to Detail D in the GSS chip. For the single sheath chip, plaintiffs' expert describes infringement theories based on: (1) Detail B as the first step and Detail C (which is the same as GSS chip's Detail D) as the second step; and (2) Detail C's ramp as the first step and Detail C's taper as the second step.[4]

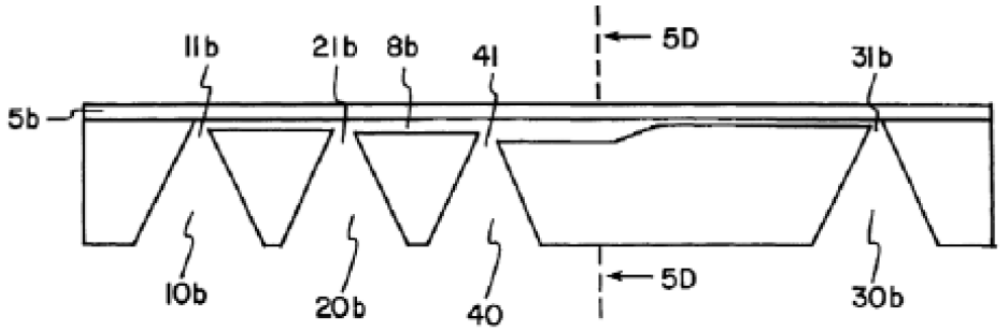
[4] Defendants purport to dispute whether plaintiffs' expert described a theory based solely on Detail C as fulfilling both steps in the single sheath chip. That theory, however, was disclosed in Dr. Vacca's supplemental report. (Vacca Suppl. Rept. (dkt. #144) ¶¶ 9, 11, 19.)

C. Prior Art References

The Cytonome patents use hydrodynamic focusing. Hydrodynamic focusing relies on laminar flow in which two fluid layers (sample and sheath) maintain their relative positions without substantial mixing. More specifically, the Cytonome patents rely on a *type* of laminar flow, called "sheath flow," in which the sample fluid is surrounded by sheath fluid on more than one side. Prior to the Cytonome patents, it was known that: (1) increasing the flow rate of the sheath fluid relative to the flow rate of the sample fluid would narrow the diameter of the sample fluid; and (2) narrowing the dimensions of the channel in which both fluids flow would narrow the diameter of the fluids in the channel. With that brief background, the parties' motions concern three prior art references: Weigl, Tashiro and Wada.

1. Weigl

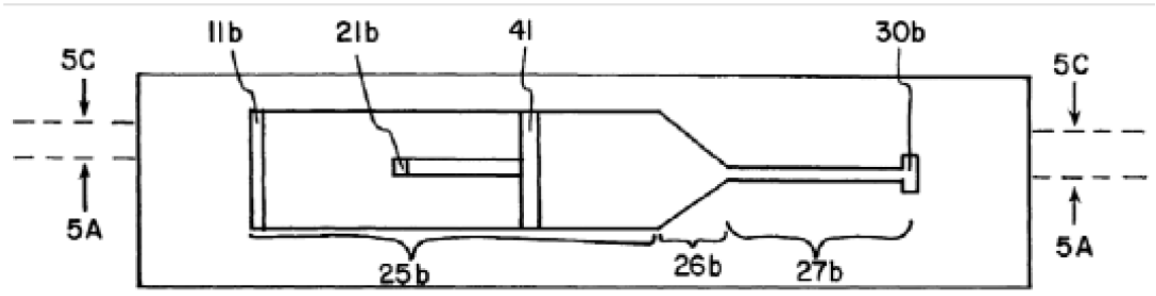
U.S. Patent No. 6,159,739, identified by one of its inventors Bernhard Weigl and entitled "Device and Methods for 3-Dimentional Alignment of Particles in Microfabricated Flow Channels," was filed on March 26, 1997, and issued on December 12, 2000. (Safiullah Decl., Ex. 7 (dkt. #166-7).) Weigl discloses a sheath flow structure that uses a microfabricated flow channel to create a sheath flow around a sample that contains particles. As reproduced below, a side view of an exemplary embodiment is disclosed in Figure 5A:



(Defs.' PFOFs (dkt. #161) ¶ 278.) This embodiment includes a sheath fluid inlet (10b) to introduce sheath fluid into the sheath flow channel (8b) at the first inlet junction (11b). Downstream of the sheath fluid inlet is a sample inlet (20b), though which a sample fluid containing particles is introduced into the sheath flow channel (8b) at the second inlet junction (21b). This embodiment also depicts a second sheath fluid inlet (40) further downstream of the sample inlet, which introduces additional sheath fluid at the third inlet injunction (41). Weigl notes that the inlets may be located on the top or bottom of the channel, and that the embodiment as a whole may be oriented in any direction.

Defendants characterize this embodiment as "pinching" the sheath fluid "away from the channel walls on three sides as it flows downstream," with the third inlet used to "introduce sheath fluid on the fourth and final side," thus "pinch[ing] the sample away from" the fourth wall. (Defs.' PFOFs (dkt. #218) ¶¶ 283-84.) Plaintiffs dispute this characterization, arguing among other things that there is no "focusing."

Weigl also provides a top-view of this same embodiment, identified as Fig. 5B:



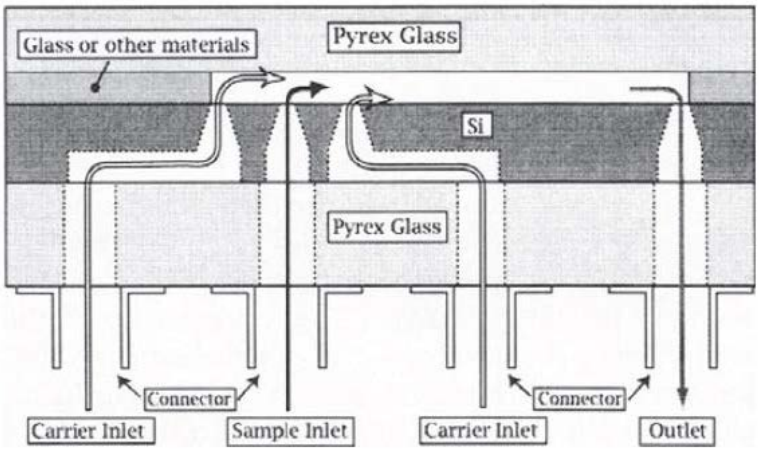
(Defs.' PFOFs (dkt. #161) ¶ 287.) Figure 5B discloses a horizontally tapered region (26b) downstream of the first sheath inlet (11b), the sample inlet (21b), and the second sheath inlet (41). The horizontal taper "may or may not occur in conjunction with a decrease in depth of the flow channel," such as in conjunction with the vertical ramp shown in the side view in the previous Figure 5A just downstream of the dashed line marked 5D. (*Id.* ¶ 288 (quoting Weigl at 12:45-47).)

While the exemplary embodiment at Figure 5A depicts "the tapered region downstream of both the sample inlet and sheath fluid inlet," defendants contend Weigl discloses that the tapered portion can alternatively be located at the sample inlet. (*Id.* ¶ 289 (citing Weigl at 10:3-4).) Indeed, the cited portion of Weigl states that: "In this embodiment, the second inlet is positioned in the upstream portion. It can alternatively be in the tapered portion. It is preferable to position the second inlet in the upstream portion because this allows for greater and more precise horizontal hydrodynamic focusing." (Weigl at 10:3-6.) Purporting to dispute this, plaintiffs point to the rebuttal report of their expert, Dr. Vacca, but he does not dispute -- nor could he -- that this language *is* in Weigl. Instead, Dr. Vacca relies on other language in the specification to contend that Weigl *teaches away from* this configuration. (Vacca Rept. (dkt. #131) ¶ 229.) While this may be true, just as the last sentence just quoted explains that positioning

upstream is "preferable," that language does not *foreclose* Weigl's configuration of the second inlet in the tapered portion. Instead, Dr. Vacca opines that "a person of skill would have no reason to relocate the fluid introductions downstream of any tapered region." (*Id.*)

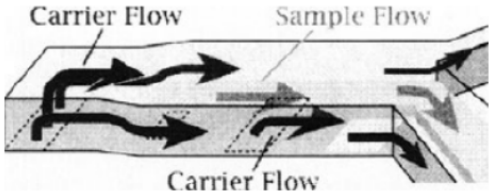
2. Tashiro

The second prior art reference is an article, titled "Design and Simulation of Particles and Biomolecules Handling Micro Flow Cells with Three-Dimensional Sheath Flow," which appears to have been published in the Micro Total Analysis Systems 2000: Proceedings of the μTAS 2000 Symposium held in Enschede, The Netherlands, 14-18 May 2000. The parties identify this piece of prior art by the last name of the lead author Koichi Tashiro. (Safiullah Decl., Ex. 9 (dkt. #166-9) ("Tashiro").) Tashiro discloses "[p]articles and cell handling micro fluidic devices . . . using laminar behavior in microfabricated flow channels." (Defs.' PFOFs (dkt. #161) ¶ 299 (citing Tashiro at 209).) In this design, sheath fluid enters a wider inlet ("Carrier Inlet") upstream of the sample inlet, as shown below.



(Defs.' PFOFs (dkt. #161) ¶ 300 (citing Tashiro at 210, Fig. 2).) Tashiro explains "[t]o realize the vertical sheath flow with simple inlet structure of carrier and sample, [a] two

step[] introduction of carrier flows was considered . . . to realize three-dimensional sheath flow," as shown in the above graphic. (*Id.* ¶ 303 (citing Tashiro at 209).) Tashiro also contains the following illustration, which defendants contend illustrates that "the design hydrodynamically focuses the sample in three dimensions away from all four walls of the channel":



(b) Proposed 3-D sheath flow

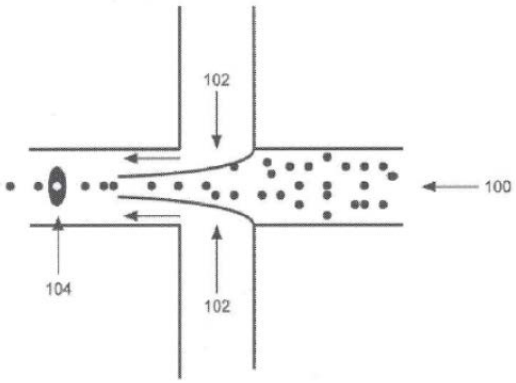
(*Id.* ¶ 304 (citing Tashiro at 210, Fig. 1(b)).)

Plaintiffs dispute whether the design discloses "focusing" of the sample, but there is no dispute that Tashiro states the design "is quite effective to put the sample flow away from the channel wall." (Pls.' Resp. to Defs.' PFOFs (dkt. #196) ¶ 305 (citing Tashiro at 209).) While defendants point out that Tashiro also states that the design realized "lateral and vertical sheath flow" (Defs.' PFOFs (dkt. #161) ¶ 306 (citing Tashiro at 211)), plaintiffs challenge whether Tashiro actually discloses this, directing the court to their expert Dr. Vacca's report, in which he opines that Tashiro discloses "surrounding" the sample with sheath flow, but not "focusing." (Pls.' Resp. to Defs.' PFOFs (dkt. #196) ¶ 306 (citing Vacca Rept. (dkt. #131) ¶ 77).)

3. Wada

Finally, U.S. Patent No. 6,505,609, identified by one of its inventors H. Garrett Wada, is entitled "Focusing of Microparticles of Microfluidic Systems" and was issued

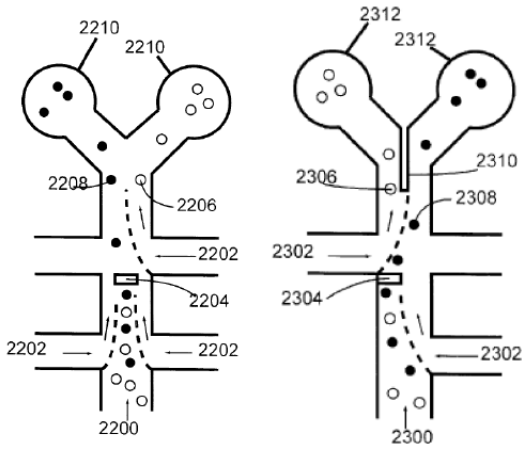
January 14, 2003. Although issued from an application filed on May 11, 2000, the actual claims priority date is based on a provisional application filed on May 17, 1999. (Safiullah Aff., Ex. 8 (dkt. #166-8) ("Wada").) Wada is directed at "[m]ethods and systems for particle focusing to increase assay throughput in microscale systems" and "it includes methods for providing substantially uniform flow velocity to flowing particles in microfluidic devices." (Defs.' PFOFs (dkt. #161) ¶ 307 (quoting Wada, abstract).) In particular, Figure 1A of Wada is reproduced below, which depicts particles that "'are typically flowed from one microchannel into the cross-junction and focused by introducing hydrodynamic flows 102 from the two orthogonal microchannels,' such that the sheath fluid surrounds the particles on at least two sides":



(Defs.' PFOFs (dkt. #161) ¶ 310 (quoting Wada at Fig. 1A, 9:8-11).)

Importantly for present purposes, Wada further discloses other embodiments in which the design "us[es] a series of offset focusing microchannels to achieve focusing by serial introduction of fluids from the offset channels." (*Id.* ¶ 311 (quoting Wada at 9:13-17); *see also id.* ¶ 313 (citing Wada at 11:61-63 (describing devices and methods that "focus and/or sort the particles")).) Even more particularly, defendants point to embodiments

that purported to show "second downstream focusing microchannel[s]" as depicted below.



(Defs.' PFOFs (dkt. #161) ¶ 314 (citing Wada at Figs. 22 and 23).) As Wada explains, "[i]n these embodiments, cells (2200 and 2300) flow into the main channel and are surrounded on their left and/or right by hydrodynamic flows of sheath fluid from microchannels (2202 and 2302)." (*Id.* ¶ 315 (citing Wada at 13:1-10, 21-24).) "The cells then pass through a detector (2204 and 2304) and are sorted into one of two wells (2210 and 2312) by hydrodynamic flows of sheath fluid entering from at least one of a pair or opposing microchannels (2202 and 2302) based on the detected properties of the cells." (*Id.* ¶ 316 (citing Wada at 13:1-16, 24-31).) Finally, Wada provides that "[t]he particles . . . are optionally focused horizontally and/or vertically in the first microchannel to provide substantially uniform flow velocity to the particles in the first microchannel." (Pls.' Resp. to Defs.' PFOFs (dkt. #196) ¶ 317).)

In response, plaintiffs do not -- and cannot -- dispute that Wada contains the language and figures described above. Instead, they dispute that Wada *actually* discloses these methods and devices, directing the court to their expert Dr. Vacca's report in which he opines that Wada is not enabling. (Pls. Resp. to Defs.' PFOFs (dkt. #196) ¶¶ 312, 314,

316-17 (citing Vacca Rept. (dkt. #131) ¶¶ 104-111).)

D. Facts Relevant to Defendants' Inequitable Conduct Counterclaim

Defendants assert that plaintiffs engaged in inequitable conduct by failing to disclose four prior art references to the USPTO in their applications for the Cytonome patents: Tashiro (discussed above), Nieuwenhuis 2001, Nieuwenhuis 2002 and Larsen. In response to plaintiffs' motion for summary judgment on this counterclaim, defendants proffer several pieces of evidence supporting a finding that the named inventors, Dr. Bunner and Dr. Gilbert, were aware of these references during the patent application process. In particular, the inventors appear to have attended conferences in 2000, 2001 and 2002 where Tashiro and the two Nieuwenhuis papers were presented and included in conference materials. These references were also later found in the inventors' personal files or, at least, in Dr. Bunner's files. (Defs.' Add'l PFOFs (dkt. #188) ¶¶ 45-63.) While plaintiffs dispute aspects of these findings, there appears to be no dispute that the inventors collectively were aware of these four prior art references. At minimum, plaintiffs do not dispute that the inventors were both aware of Tashiro during the Cytonome patent application process. (*See, e.g.*, *id.* ¶ 63 (undisputed that Bunner and Gilbert admitted that "they were aware of Tashiro during prosecution of the Cytonome patents").)

In their depositions, the named inventors of the Cytonome patents explained that they believed it was unnecessary to provide the USPTO with Tashiro. Specifically, Dr. Bunner testified that the applicants did not provide Tashiro to the patent office because: "it was redundant. We felt it was redundant to what Weigl was disclosing." (Pls.' PFOFs (dkt. #164) ¶ 93 (quoting Bunner Dep. (dkt. #93) 229).) Similarly, Dr. Gilbert testified

that they did not provide Tashiro because it "is a derivative of Weigl," and Weigl is "earlier," "bigger" and has a "more robust discussion." (*Id.*at ¶ 102 (quoting Gilbert Dep. (dkt. #92) 304-05).) Gilbert similarly testified that it was not necessary to disclose the Nieuwenhuis 2001 and Nieuwenhuis 2002 references because they were, in turn, derivative of Tashiro. (*Id.* ¶¶ 103-104 (citing Gilbert Dep. (dkt. #92) 306-07, 367.)

In submitting the application for the Cytonome patents, Dr. Bunner declared as follows:

> I hereby state that I have reviewed and understood the contents of the above identified specification, *including the claims*, as amended by an amendment, if any, specifically referred to herein.

(Defs.' Add'l PFOFs (dkt. #188) ¶ 71 (quoting Mulder Decl., Ex. 10 (dkt. #189-10) 2) (emphasis added).) At his deposition, however, Dr. Bunner acknowledged that he "rarely review[s] the claims of patents on which I'm an author. I always review the specification but often have not reviewed the claims." (Pls.' PFOFs (dkt. #164) ¶ 94 (quoting Bunner Dep. (dkt. #93) 184).) In fairness, when questioned further, Bunner clarified that he "cannot say that I did not read the claims," and further stated that he "understood the claims," and that he stood by the affidavit submitted to the USPTO that he understood the claims. (*Id.*) Brunner also testified that it was "quite likely that I understood [the claims], but poorly," explaining that he did not understand the "legal ramifications" of the claims, but he understood the invention. (*Id.* ¶ 95, 97 (quoting Bunner Dep. (dkt. #93) 188-89, 363.)

E. Facts Relevant to Defendant ABS's Breach of Contract Counterclaim

Defendant ABS also asserts a breach of contract counterclaim based on plaintiff ST's alleged failure to deliver sexed bull semen in compliance with an agreement between ST and ABS, dated September 1, 2012. (Moreno Decl., Ex. A ("2012 Agreement") (dkt. #165-1).)[5] As part of that agreement, ABS provided bull semen to ST for sorting by X-chromosome or Y-chromosome. The sorted semen would then be packaged into "straws," and ABS would pay ST for those straws.

The 2012 Agreement required that the sorted semen sold to ABS meet a purity threshold.[6] The contract defines "Purity" as "the ratio of the number of sperm cells of the requested gender to the total number of sperms cells in such straw." (2012 Agreement (dkt. #165-1) § 1.) The contract also defines "Primary Gender Straws" as "straws containing a Purity of approximately 87%, but in no event, less than 85% Primary Gender sperm." (*Id.*) Similarly, "Secondary Gender Straws" are defined as "straws containing a Purity of approximately 87%, but in no event, less than 85% Secondary Gender sperm." (*Id.*) Section 12 of the Agreement further states: "ST warrants only the purity of the sorted semen products and makes no warranty as to the success rate with respect to gender at birth." (*Id.* § 12 (altered all caps).)

At the time the 2012 Agreement was executed, there were multiple ways of

[5] The term of the 2012 Agreement was five years and, thus, ran through August 31, 2017.

[6] In its counterclaim, ABS originally alleged that the sexed semen straws failed to meet contractual requirements for (1) motility, (2) concentration, and (3) purity. In its brief in opposition to ST's motion for summary judgment, however, ABS abandons the motility and concentration portions of its breach of contract counterclaim, so the court will only address the purity requirement.

evaluating the purity of sorted semen, including flow cytometer reanalysis and fluorescent insitu hybridization, and it was known that different purity-measuring techniques could produce different, even potentially conflicting, results. Nevertheless, the Agreement did not specify which methodology should be used to determine compliance. ABS does not dispute this fact. However, ABS points out that purity is "expressly defined in the agreement with reference to a matter of objective fact, *i.e.*, 'the ratio of the number of sperm cells of the requested gender to the total number of sperm[] cells in such straw.'" (Defs.' Resp. to Pls.' PFOFs (dkt. #187) ¶ 154 (quoting 2012 Agreement (dkt. #165-1) § 1).) ABS contends, therefore, that while there may be conflicting evidence of whether this requirement has been satisfied, "the requirement itself concerns *actual* purity, which turns on the *actual* cells, not on any single 'purity-testing methodology.'" (*Id.*)

Regardless, ST chose "flow cytometer reanalysis" as the sole method used to evaluate purity for the purposes of determining compliance with the purity requirement throughout the five year life of the 2012 Agreement. ABS was also aware that ST used flow cytometer reanalysis for its purity valuations during the course of an earlier, long-term agreement between the parties. Moreover, at no point leading up to or during the course of the 2012 Agreement did ABS request that ST use a different purity measurement method. Finally, during the course of performing under the 2012 Agreement, ST routinely provided straws of sorted semen to ABS whose purity had been determined using flow cytometer reanalysis, and ABS routinely accepted such straws. Moreover, ABS does not dispute that this was the sole test run in the laboratory, but contends that ST also claimed to be comparing its results against "actual customer experience in the field." (*Id.* ¶ 155.)

On July 6, 2017 -- over four years and ten months into the five-year term of the 2012 Agreement -- ABS sent ST a letter asserting that four batches of straws purportedly failed to meet the 2012 Agreement's minimum purity requirement.[7] (Moreno Decl., Ex. B (dkt. #165-2).) ABS neither disputes that these batches had passed ST's quality control testing, exceeding the minimum purity requirement, nor that ST retested straws from each of these batches in response to ABS's letter and found that all four of the batches retested at greater than 90% purity. Nevertheless, ABS contends that *its* testing revealed that the batches fell below the contractual 85% purity requirement. Even after sending this letter, however, ABS continued to place orders with and accept straws of sorted semen from ST.

On September 1, 2017 -- one day after the 2012 Agreement ended -- ABS sent ST another letter alleging that additional batches of straws failed to meet the minimum purity requirement. In total, ABS identified thirty-two batches of straws, which ABS contends do not meet the minimum purity requirement. Of those, ABS only returned straws from ten batches. ST retested three straws from each of those ten batches, finding that all straws exceeded the 85% minimum purity required by the 2012 Agreement. Again, ABS does not dispute this, but contends that according to *its* tests, the straws fell below the contractual 85% purity requirement.

As further context, sometime in late 2016, but within the final year of the 2012 Agreement, ABS developed and began using a different, assay-based purity measurement

[7] The letter also stated that another six batches failed to meet the motility standard, and one batch of straws that failed to meet the purity requirement also failed to meet the motility requirement, but ABS is no longer claiming a breach of contract based on insufficient mobility.

method called "ddPCR."[8] In large part, ABS relies on this testing method in claiming that the ST straws do not meet the minimum purity requirement.[9]

ABS also points to ST's internal documents, which purport to raise concerns about the accuracy of ST's purity testing. Specifically, in a series of ST internal emails from May 2015, ST's Vice President of Flow Cytometry, Mike Evans, expressed his view that "a lot" of the purity results reported as 87% "may actually [have] been below 87 and should have failed." (Defs.' Add'l PFOFs (dkt. #188) ¶ 114.) In another email, Evans reports in May 2015 that some ST labs were "typically overestimating the purity by up to 5%." (*Id.* ¶ 116.) ST's head of Research and Development Vish Vishawanath also considered it "telling" that the number of straws tested by ST employees at its lab located at ABS identified as having "exactly 87%" purity. (*Id.* ¶ 115.) In an August 2015 internal email, ST's Thom Gilligan raised similar concerns about ST employees' overestimating purity, "especially since the employees have an incentive not to fail on purity." (*Id.* ¶ 120.) In November 2015, ST generated an internal "Purity Assessment Audit," which described some concerns, including "[l]abs did not have a good handle on proper purity assessment with some labs fudging to pass." (*Id.* ¶ 123.) A September 2016 email from an ST researcher, Dr. Leo Britto, attached a "Purity Analysis Review," showing that 25% of the purity analysis images at the ABS Deforest facility were "unsatisfactory" in June 2016. (*Id.*

[8] While there appears to be a wider or more general application of this protocol, ABS acknowledged that its use of this term refers to a "specific application of the ddPCR technology as a qualitative control measure." (Pls.' Reply to Pls.' PFOFs (dkt. #214) ¶ 183.)

[9] ABS submits several facts about the reasons why it conducted its own testing in May or June 2017, which seems only tangentially related to the claim and the present motion. Thus, the court has not included these facts.

¶ 127.)

Despite ABS's claimed concerns about purity, it admits that ST straws from the alleged non-compliant batch were sold "in the normal course" of business" and that "no special discounts were given." (Pls.' PFOFs (dkt. #163) ¶ 192.) At the same time, there is no dispute that ST offers its customers lower-purity sexed semen for a lower price. Under at least one contract with a major U.S. bull stud, ST charged a bull stud $4 less per straw for at least 75%-pure sexed semen than for 85%-pure sexed semen.

OPINION

I. Defendants' Motion for Summary Judgment and Claims Construction

A. Claims Construction[10]

1. "Direction" terms

As quoted above, the four Cytonome patents all contain claims involving a two-step process: (1) focusing (or injecting or adjusting) sheath fluid "in at least a first direction," and (2) focusing (or injecting or adjusting) sheath fluid "in at least a second direction different from the first direction." The parties dispute whether the second focusing may be in a direction that overlaps with one of the directions of the first step. Defendants maintain that the focusing at the second step may *not* be in any of the same directions as that in the first step. In other words, if at the first step, the sample was focused from the right, from the left and from the bottom, the second step may not include focusing from the right, from the left *or* from the bottom. On the other hand, plaintiffs contend that

[10] The court adopts the same standard as described in its prior opinion and order.

focusing can happen in the same direction in both steps, so long as at least *one* of the directions is different. In other words, the direction of focusing may not be exactly the same at each step. For example, if at the first step, the sample was focused from the right, from the left and from the bottom, the focusing at the second step could again be from the right, from the left and from the bottom, provided it also came from the top as well.

Both sides claim that the embodiments support their respective positions. Defendants relies on the text describing the preferred embodiments. Specifically, the text describes an embodiment at the "primary focusing region," which "focuses the sheath fluid away from the sides and bottom of the sample," and at the "secondary focusing region," which "focuses the sample in a vertical direction from above the sample." ('476 patent at 4:63-5:7.) Another embodiment similarly describes "[i]n the primary focusing region **17**, the sample particles injected into the sheath flow are focused away from the sides and bottom of the sheath flow," whereas in the "secondary focusing region **19**," sheath fluid is introduced "compressing the suspended sample away from the upper wall of the channel **12** (i.e., in the *other* direction from the main sheath of fluid around the particle)." (*Id.* at 6:9-11, 50-57.) So, too, in another embodiment, the sample in the primary focusing region "is focused on three sides by accelerating sheath fluid," and sheath fluid enters the "second focusing region **19** to focus the suspended particles on the fourth side." (*Id.* at 7:55-63.) In all of the descriptions of the embodiments, there is *no* overlap in the direction or directions at the first step and in the direction or directions at the second step.

Given that each of the embodiments contain *no* overlap in directions at the two focusing steps, plaintiffs understandably choose not to address the language of the patents'

embodiments. Instead, they contend that the *figures* in the specifications themselves support their position that the claim contemplates some overlap in directions at the two steps. In particular, plaintiffs contend that each of the figures shows "tapering" at both the primary and secondary focusing regions, and, therefore, the patents' preferred embodiment as depicted in the figures disclose focusing on both the left and right sides at *both* steps. Moreover, because defendants' construction would exclude each of these figures, plaintiffs argue it cannot be correct. *See Kaneka Corp. v. Xiamen Kingdomway Gro. Co.*, 790 F.3d 1291, 1304 (Fed. Cir. 2015) ("A claim construction that excludes a preferred embodiment is rarely, if ever, correct. A construction that excludes all disclosed embodiments . . . is especially disfavored.") (internal citations and quotations omitted).

In making this argument, however, plaintiffs rely on "tapering" visible in the various figures to argue that both steps or focusing regions -- depicted as 17 and 19 in the figure below -- disclose focusing on both sides:

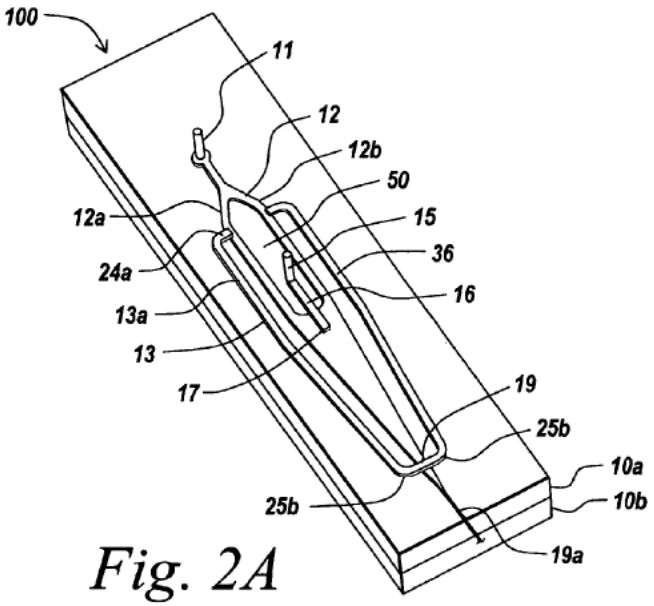


Fig. 2A

('476 patent at Fig. 2A.) As depicted, the primary focusing region at 17, shows tapering

of the sheath flow channel. In other words, the channel "tapers from a relatively wide width W at the outlets . . . to a small width W," as does the secondary focusing region at 19. Defendants do no dispute that Figure 2A ostensibly shows tapering at both focusing regions, but contend that Figure 4A -- depicted in the fact section above -- does *not* show tapering at the second focusing region.

However, the reliance on "tapering" alone is a bit of red herring since tapering is not the same as focusing, at least as used in the context of these patents. Instead, while the specification describes how tapering may facilitate focusing (*see, e.g.*, '476 patent at 6:17-21), it primarily describes the injection or insertion of sheath fluid as focusing the sample. (*See, e.g.*, *id.* at 6:9-11 ("the sample particles injected into the sheath flow are focused away from the sides and bottom *by* the sheath flow" (emphasis added)); *id.* at 6:27-29 ("the secondary focusing region **19** *utilizes* sheath fluid to provide secondary focusing of the sheath flow" (emphasis added)); *id.* at 7:55-58 (sample "is focused on three sides *by* accelerating sheath fluid" (emphasis added); *id.* at 7:50-53 ("[a]dditional sheath fluid **130** enters the primary sheath flow channel **12** through a connector in the secondary focusing region **19** *to focus* the suspended particles on the fourth side" (emphasis added)).)

Most critically, in the description of the figures, the specification does *not* describe focusing on the sides at the secondary focusing region even though the figure shows tapering. Rather, as quoted above, the specification describes focusing from above or top or fourth side in the secondary focusing region of each embodiment. Although both sides primarily rely on the specification to support their respective claims construction positions, therefore, the court: (1) agrees with defendants that the text of the specification supports

a construction requiring *no* overlap in directions in the focusing (or injecting or adjusting) of sheath fluid in the two steps; and (2) disagrees with plaintiffs that the patents' figures support (much less require) a different construction.

2. "Focusing" terms

The '476, '309, and '161 patents all contain the term "focusing," "focuses" or "focus" in various claims. Defendants contend that the term means "narrowing, pinching, or otherwise confining the particle stream with the sheath fluid." (Defs.' Opening Br. (dkt. #62) 58.) Plaintiffs maintain that the term includes additional limitations. Indeed, in an apparent effort to avoid an invalidity challenge, plaintiffs offer the following, cumbersome definition for this seemingly straightforward verb:

> Accelerating sheath fluid to exert a force on the particles, which narrows and aligns the particle stream in a desired direction relative to the boundaries of the channel, while achieving or maintaining laminar flow. Merely introducing a sample fluid at a particular position in a straight flow passage does not constitute focusing.

(*Id.*)

In large part, the stark contrast in the parties' dispute turns on whether the Cytonome patent applicants made a disavowal of the broader definition proposed by defendants in the prosecution of the patents. Prosecution disclaimer is a doctrine that prevents "patentees from recapturing through claim interpretation specific meanings disclaimed during prosecution." *Mass. Inst. of Tech. v. Shire Pharms., Inc.*, 839 F.3d 1111, 1119 (Fed. Cir. 2016) (quoting *Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1323 (Fed. Cir. 2003)). However, the doctrine only applies where the patentees' disavowal is "both clear

and unmistakable." *Id.* (quoting *3M Innovative Props. Co. v. Tredegar Corp.*, 725 F.3d 1315, 1325 (Fed. Cir. 2013)). Anything short of "clear and unmistakable," which must be proved by the party attempting to invoke prosecution disclaimer, does not warrant application of the doctrine. *Id.*

During the prosecution of the Cytonome patents, the applicants responded to a non-final office action rejecting certain claims based on the "Ohki reference" -- U.S. Patent No. 4,983,038. In particular, the applicants distinguished how the Ohki reference from the patented invention as follows:

> Even if the sample fluid flow passage 10 and the opening 12 can be considered to position the same fluid at a certain location of the capillary flow passage 6 of the ju[n]ction 11 of the two flow passages 5, the opening 12 does not *focus* sheath fluid around a particle, because a particle has not yet been injected <u>in</u> the sheath fluid when it passes through the opening 12 and/or the projections 18 in the system of Ohki. <u>Focusing of a particle in sheath fluid requires acceleration and removal of sheath fluid from around a particle, which does not occur from the mere injection of a sample fluid in a flow passage.</u> Rather, the opening 12 and projections 18 of Ohki merely position a sample fluid at a particular location within a capillary flow passage, without performing *focusing* of sheath fluid around a particle.

(Mulder Decl., Ex. 10 (dkt. #159-10) 12 (italics in original; underlying added for emphasis).)

Defendants argue that this language is not a "clear disavowal" under applicable law. Instead, defendants contend this passage is describing a prior art reference, rather than the patented invention. However, statements about a prior art reference can still constitute a disclaimer, at least when made in an effort to distinguish the prior art reference from the patented invention. *See Am. Piledriving Equip., Inc. v. Geoquip, Inc.*, 637 F.3d 1324, 1336

(Fed. Cir. 2011) (The Federal Circuit has "made clear . . . [that] an applicant's argument that a prior art reference is distinguishable on a particular ground can serve as a disclaimer of claim scope even if the applicant distinguishes the reference on other grounds as well."). Defendants also argue that the thrust of this passage concerns the applicant's effort to clarify or correct the examiner's understanding of the Ohki invention. Specifically, defendants argue that the applicant clarifies that in Ohki the sample has not yet been injected and, therefore, there is no focusing at component 10. Fair enough. The court agrees that the above paragraph -- along with the two paragraphs surrounding it -- primarily concerns the placement of the focusing region vis-à-vis the sample injection site. But the passage also contains an unambiguous statement of what focusing is -- "acceleration and removal from around a particle" -- and more importantly, what focusing is *not* -- "mere injection of a sample fluid in a flow passage."

Plaintiffs also point to the PTAB's finding of this same prosecution disclaimer as part of the *inter partes* review. Specifically, PTAB decided that "merely introducing a sample fluid at a particular position in a straight flow passage does not constitute focusing because focusing required acceleration of the sheath fluid." (Pls.' Add'l PFOFs (dkt. #197) ¶ 73.) Neither party, however, directs the court to any case law describing what, if any, deference this court should give to this preliminary decision. Indeed, without the benefit of the full record before this court, including a named inventor's deposition testimony that "focusing" does *not* include the limitations plaintiffs now seek, there is little basis for placing weight on the PTAB's finding, either way. Still, the court independently comes to the same conclusion because the statement quoted above does constitute a disclaimer in

the prosecution of Cytonome patents, whether the inventors intended it or not. In particular, the patent application defined focusing in the invention as requiring "acceleration" and disclaimed "mere injection of a sample fluid in a flow passage" as focusing.[11]

In fairness, defendants persuasively point to portions of the specification, which treats acceleration as distinct from focusing. (Defs.' Opening Br. (dkt. #162) 62.) Absent a disclaimer, this argument would be compelling, but a prosecutorial disclaimer trumps other language in the specification. *Uship Intellectual Properties, LLC v. United States*, 714 F.3d 1311, 1316 (Fed. Cir. 2013) ("Even if the specification had disclosed an embodiment where a human performed the entirety of the validation step, prosecution disclaimer could result in that embodiment not being covered by the claims."). In other words, the patent applicant limited the term "focusing" to requiring acceleration.

Of course, plaintiffs' proposed construction extends well beyond the purported disclaimer to include limitations about aligning and acceleration itself. The court is unpersuaded that the definition of "focusing" should include any additional limitation. Certainly, plaintiffs have failed to explain why the definition should extend beyond the language of the disclaimer. Moreover, at the hearing, plaintiffs were primarily concerned

[11] The quoted passage also contains language that focusing requires "removal of sheath fluid from around a particle." In their response, plaintiffs abandon their experts' attempt to rewrite the language of the disclaimer, and instead offer a plain reading: "removal of sheath fluid *from around the particle*" occurs "as the sheath fluid accelerates and 'stretches.'" (Pls.' Opp'n (dkt. #191) 44.) In their reply brief, defendants chose not to dispute this reading. Regardless, the court rejects defendants' argument that this part of the disclaimer is unclear, although it appears redundant of the "narrowing, pinching or confining" language in the construction. Moreover, neither party is arguing that the "removal" language is material to the construction of focusing.

about the inclusion of the "mere injection" language in the construction.

As such, the court will construe "focusing" to mean "narrowing, pinching or confining the particle stream or sample fluid with the sheath fluid, causing acceleration of the sheath flow. However, mere injection of a sample fluid in a flow passage does *not* constitute focusing." In adopting the latter disclaimer, the court clarifies that the "mere injection" disclaimer does not mean that focusing cannot incur at the spot where a sample is injected into a sheath flow, but rather that it would not satisfy focusing for purposes of the Cytonome patents. In other words, focusing may well occur at the sample injection spot, assuming there is either a structural basis for focusing, e.g., a taper or a ramp, or the sample fluid is injected into sheath fluid moving at a rate that creates focusing.

3. '912 patent preamble

The parties next dispute whether the preamble of the '912 patent is limiting. "Generally, the preamble does not limit the claims." *Georgetown Rail Equip. Co. v. Holland L.P.*, 867 F.3d 1229, 1236 (Fed. Cir. 2017) (citation omitted). The preamble "is not a claim limitation if the claim body defines a structurally complete invention . . . and uses the preamble only to state a purpose or intended use for the invention." *Id.* (internal quotation marks and citation omitted).

Here, each of the independent claims begin with the language: "A flow structure for suspending a particle in a sheath fluid, comprising . . . ." (*See, e.g.*, '912 patent at 11:21-22.) Defendants contend that this language is *not* limiting because the claims themselves go on to define a "structurally complete invention." (Defs.' Opening Br. (dkt. #162) 69.) In this context, defendants argue, the preamble language simply describes the purpose or

intended use of the invention. Plaintiffs respond that the preamble is limiting by its terms, and they seek a construction that limits the invention to "a flow structure for placing a particle in a smooth laminar sheath fluid flow, comprising" the claim elements. (Pls.' Opp'n (dkt. #191) 56.) Specifically, plaintiffs argue that the preamble is necessary because the other limitations in the claims do not mention the word "particle." "A structure that injects 'sheath fluid' into a channel that contains no particles serves no purpose and is inconsistent with every embodiment provided in the Cytonome Patent specifications." (*Id.*)

As explained in the court's preliminary pretrial conference order on patent cases, parties are required to "show that construction is material to a disputed issue of infringement or invalidity." (Prelim. Pretrial Conf. Order (dkt. #53) ¶ 7.) Here, the parties have failed to make such a showing. As such, the court declines, at this time at least, to construe the preamble. Moreover, the PTAB's recent finding that the each of the challenged claims of the '912 is unpatentable (dkt. #275-1) and the court's finding below of non-infringement moots any need to construe the preamble.

4. "primary focusing region"

Next, defendants seek a construction of "primary focusing region" in all asserted claims of the '476 patent. Defendants contend that the term means "the first focusing region downstream of the sample inlet." (Defs.' Opening Br. (dkt. #162) 71.) In contrast, plaintiffs contend that the term simply means "*a* first focusing region." (*Id.* (emphasis added).) In other words, plaintiffs construe the term so that the meaning of "primary" is relative to the "secondary focusing region," but does not impose a limit as the relationship

to any other focusing regions, accordingly a "primary focusing region" could come after another focusing region so long as it precedes the "secondary focusing region." (Pls.' Opp'n (dkt. #191) 64.)[12]

In support of their more limited construction, defendants point to language in the claims themselves describing the primary focusing region as "extending downstream of the sample injection site." ('476 patent at claim 1.) Defendants also point to language in the specification that describes the "primarily focusing region" as "in the vicinity of a sample channel connected to the sample inlet." (*Id.* at 2:1-2.) While this language would appear to be further support for finding that the sample injection site (or inlet) cannot be a focusing region, neither the claim language nor the specification provide support for requiring a further limitation that the "primary focusing region" be the first focusing region after the sample inlet. Instead, the plain language of the claim *and* the use of "primary" and "secondary" indicates that there must be a *first* focusing region preceding a *second* focusing region. Accordingly, the court will adopt plaintiff's construction that "primary focusing region" simply means "a first focusing region" relative to a "secondary focusing region."

5. "primary flow channel"

Finally, defendants seek construction of the term "primary flow channel" in all

[12] Plaintiffs further respond that the construction does not matter because a number of their infringement theories rest on Detail B being deemed the primary focusing region, which the parties agree is also the first focusing region. For the reasons explained below, however, any infringement theory resting on Detail B fails as a matter of law in light of the court's construction of the direction terms. As such, this construction is material to plaintiffs' claims of infringement.

asserted claims of the '161 and '912 patents. In what becomes a fairly rambling argument, defendants maintain that this term is indefinite because plaintiffs' expert, Dr. Vacca, presumably one skilled in the art, treats "primary flow channel" and "primary sheath flow channel" differently, even though the specification uses the "two terms interchangeably to refer to the same elements of the disclosed embodiments." (Defs.' Opening Br. (dkt. #162) 74.) In other words, defendants do not argue so much that the claims "fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention" *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014), but rather that plaintiffs' expert is misusing it. Indeed, defendants contend that the meaning of "primarily flow channel" or "primarily sheath flow channel" *is* clear from the specification, and may be used interchangeably, highlighting in their brief that portion of the embodiment in Figure 2A shown below:

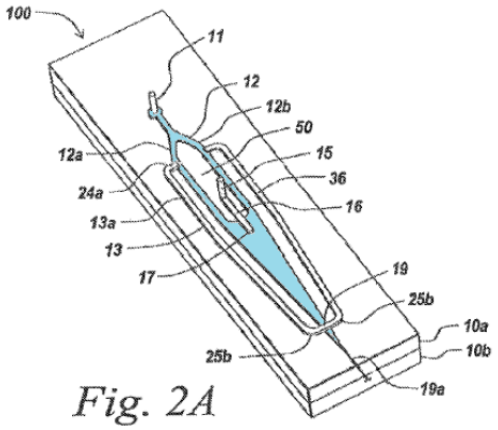


Fig. 2A

(Defs.' Opening Br. (dkt. #162) 74 (citing '161 patent at Fig. 2A).)

As such, this is not a proper claims construction request. Defendants are simply challenging Vacca's infringement opinion, which, if relevant at trial, they are welcome to pursue. The court declines to construe this term, however, at least at this time.

B. Noninfringement

As described above in the facts section, there are two alleged infringing products: GSS and single sheath chip. Plaintiffs pursue four infringement theories, across the four patents, all of which are based on the location of the primarily focusing region and secondary focusing region in each product: (1) for GSS, Detail B as the primary focusing region and an Detail C as the secondary focusing region; (2) for GSS, Detail B as the primary focusing region and Detail D as the secondary focusing region, (or for the single sheath chip, Detail B as the primary focusing region and Detail C as the secondary focusing region); (3) for GSS, Detail C as the primary focusing region and Detail D as the secondary focusing region; (4) for GSS, Detail D as containing both the primary focusing region (the ramp) and the secondary focusing region (the taper) (or for single sheath, Detail C containing both the primary and secondary focusing regions -- the ramp and the taper as separate regions).[13] For the '161 and '912 patents, however, plaintiffs' theory of infringement is limited to the first theory and only concerns the GSS technology.

1. Infringement Theories Based on Detail B as the Primary Focusing Region

For both products at Detail B, there appears to be no dispute that the sample is focused away from all four walls, or focused "radially inward." As a result, were Detail B to be deemed the primary focusing region, then focusing in the secondary focusing region would necessarily overlap, thus dooming plaintiffs' first two theories of infringement.

[13] Consistent with the parties' arguments, the court primarily uses the claim language of the '476 patent, recognizing that the claims in the other patents may use slightly different language in requiring discuss this primary region or first step. For this reason, the court's discussion of the infringement theories applies generally to all four Cytonome patents.

Plaintiffs nevertheless argue that there is a factual dispute as to whether radially inward is the same as focusing away from all four walls, but this is not a factual dispute that would warrant jury consideration. At most, it is a semantics issue best left for the court to decide; at least, it is a silly argument. Regardless, the court finds that for purposes of the Cytonome patents, focusing radially inward is the same as focusing away from all four of the outer walls. As such, any infringement theory premised on Detail B as the primary focusing region ('476 patent), primary adjustment region ('161 patent), first step ('309 patent), or first sheath fluid introduction region ('912 patent) fails as a matter of law under the court's construction of the "direction" terms.[14]

2. Infringement Theories Based on Detail C as the Primary Focusing Region and Detail D as the Secondary Focusing Region ('476 and '309 patents)

As for the '476 and '309 patents, plaintiffs assert a third infringement theory as to the GSS technology where Detail C is the primary focusing region and Detail D is the secondary focusing region. As explained in the facts section above, there is no dispute that at Detail C, sheath fluid is focused from above (also described as away from the top wall) to position the sample in the center of the flow for detection. The parties, however, dispute the directions at play in Detail D. Plaintiffs contend that the taper focuses from the left and right sides and the ramp focuses from the bottom only, meaning that there would be *no* overlap in directions between Detail C and Detail D (considering the ramp and taper

[14] In light of this finding, the court also need not consider defendants' motion for noninfringement of dependent claim 18 of the '912 patent because the accused infringing technology does not satisfy the "substantially aligned" limitation.

collectively or as separate regions or steps). Defendants contend, however, that plaintiffs' own expert conceded that Detail D's ramp also focuses from the top. If so, the directions of Detail D (all four sides) would obviously overlap with the direction of Detail C (from the top).

As support, defendants point to Dr. Vacca's invalidity report, which discusses a ramp in the Weigl prior art reference and opines that the vertical ramp would squeeze the sheath fluid and sample "from the top and bottom." (Vacca Rebuttal Validity Rept. (dkt. #131) ¶ 213.) In his infringement report, discussing the alleged infringing technology, Vacca, however, consistently opined that the ramp in Detail D of the GSS chip solely focused from the bottom. (Vacca Infringement Rept. (dkt. #130) ¶¶ 143, 600; Vacca Suppl. Infringement Rept. (dkt. #144) ¶ 9.) Certainly, this appears to be a rich area for cross-examination: why would the ramp in Weigl function differently than the ramp in the accused infringing technology? However, plaintiffs have still done enough to create a material issue of disputed fact as to the directions implicated in Detail D. Because a reasonable fact finder could conclude that there is no overlap in the directions at Detail C and Detail D, the court will deny summary judgment to defendants as to this infringement theory under the court's construction of the direction terms.

In addition, defendants seek summary judgment on the basis that Detail C cannot be the primary focusing region because it is not the first focusing region after the sample insertion site, Detail B is. For the reasons explained above, however, the court already rejected defendants' narrow construction of "primary focusing region." Therefore, this basis for summary judgment fails as a matter of law.

Accordingly, the court will deny defendants' motion as to the infringement theory for the GSS chips based on: (1) Detail C as the primary focusing region of the '476 patent or first step of the '309 patent; and (2) Detail D as the secondary focusing region of the '476 patent or second step of the '309 patent.

3. Infringement Theories Based on Detail D for GSS and Detail C for Single Sheath as *Both* the Primary and Secondary Focusing Regions ('476 patent)

Plaintiffs' fourth theory of infringement, limited to the '476 and '309 patents, concerns Detail D for the GSS technology and Detail C for the single sheath chip.[15] Under this theory, the ramp is the primary focusing region or first step, and the taper is the secondary focusing region or second step. As described above, the ramp focuses from the bottom (and the top, according to defendants), while the taper focuses from the sides. Accordingly, this theory meets the directional limitation under either parties' views.

Defendants nevertheless makes a superficial, one paragraph argument that summary judgment is warranted as to the *'476 patent* because Detail D cannot constitute two separate "regions as a matter of law," apparently conceding for purposes of summary judgment that Detail D can contain two separate "steps." (Defs.' Reply (dkt. #217) 74.) Defendants make *no* attempt to explain *why* this is so, whether as a matter of law or fact. Indeed, defendants do not even seek a construction of the word "regions" at all, much less one that draws a meaningful distinction between "regions" and "steps" as used in the '476

[15] For the reasons explained above, this theory fails as a matter of law for the '912 patent given that there is no injecting of sheath fluid at Detail D for the GSS technology or Detail C for the single sheath chip.

and '309 patents, respectively, and certainly not a construction that would *foreclose* a finding by the jury that Detail D's ramp is located in a separate region from its taper. Even if defendants had sought a construction of "region," Figure 1 of the Cytonome patent specification (depicted above in the fact section), describes two focusing regions, the primary at 17 and the secondary at 19, with no apparent demarcation between the two along the same narrowing channel. ('476 patent at Fig. 1.) Accordingly, whether someone skilled in the art would understand that Detail D contains two focusing regions or steps for purposes of infringement of the asserted claims of the '476 and '309 patents is a factual issue to be resolved by the jury. Accordingly, the court will deny this basis for summary judgment.

4. Tapering

Defendants also seek a finding of noninfringement of claims 5, 27 and 28 of the '476 patent, all of which concern focusing regions formed by "tapering" the primary sheath flow channel.[16] For example, claim 5 provides, "The sheath flow channel of claim **1**, wherein the primary focusing region is formed by tapering the primary sheath flow channel in a direction along which fluid flows therethrough," which results in fluid acceleration as a basic principal of laminar flow. ('476 patent at claim 5.)

Defendants contend that the area plaintiffs identify as a taper in the alleged

[16] Defendants also move on dependent claim 21. That claim, however, does not mention "tapering." Instead, it concerns the placement of the sample inlet vis-à-vis the primary sheath flow channel. While claim 21 does refer to the sample inlet "intersect[ing] a relatively wide portion of the primary sheath flow channel," defendants' arguments about "tapering" is too far afield to apply to this limitation.

infringing technology is simply where "two subchannels of the primary sheath flow channel come together," as depicted in green below in an image from *plaintiffs'* expert report:

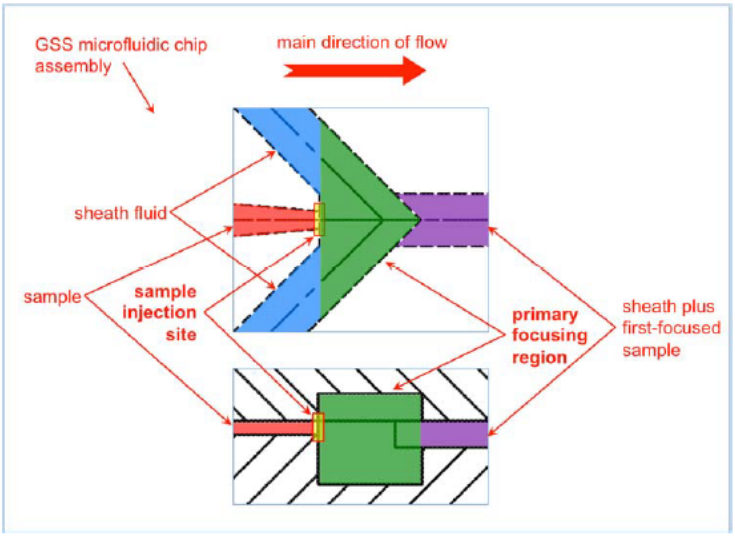


Fig. 47. Excerpt from ABS_2017_00017805, Detail B (microfluidic chip assembly drawing, annotations added; top—top view; bottom—cross-section). The region marked in green is the primary focusing region, downstream of the sample injection site (yellow). The sample inlet is red, the primary sheath flow channel upstream of the primary focusing region is blue, the primary sheath flow channel downstream of the primary focusing region is purple.

(Defs.' Opening Br. (dkt. #162) 193 (citing Vacca Rept. (dkt. #130) ¶ 135).) Defendants then argue that the area marked in purple is the primary sheath flow channel downstream of the primary focusing region, where there is no tapering, because the walls are parallel. Therefore, defendants contend, there is no change in this region from a relatively wide width to a smaller width, as the patent defines tapering. (*Id.*; *see also* Defs.' Reply (dkt. #217) 77-78.)

However, defendants offer no justification for concentrating on the parallel lines of the purple area alone, much less why it is material. Nor can the court discern why it is material whether the lines of the flow channel downstream of the focusing area are parallel, and therefore do not taper, if focusing is satisfied in the green area just above. In other words, claim 5 and the other claims concern forming focusing regions by tapering. Here,

according to the depiction above, the primary focusing region, shown in green, narrows from a relatively wide width to a smaller width, or at least a reasonable jury could so fine. The fact that two subchannels come together in this area does not foreclose a finding by a reasonable jury that this area was formed by tapering. Accordingly, the court will deny this basis for summary judgment.

C. Invalidity Due to Anticipation

In challenging the validity of the Cytonome patents based on three prior art references -- Weigl, Tashiro and Wada -- defendants offer an astonishing 700 proposed finding of facts specific to these three prior art references, marching through each asserted claim of the Cytonome patents, virtually all of which plaintiffs purport to dispute. Rather than trying to reconcile such a staggering number of disputed facts, much less scientific propositions, the court will limit its analysis to whether these three prior art references disclose "focusing" as previously construed.[17]

To demonstrate anticipation, "the proponent must show 'that the four corners of a single, prior art document describe every element of the claimed invention.'" *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008) (quoting *Xerox Corp. v. 3Com Corp.*, 458 F.3d 1310, 1322 (Fed. Cir. 2006)). "Because the hallmark of anticipation is

[17] The court recognizes that anticipation challenges to the '912 patent, which involves "injecting" sheath fluid, and to the independent claims of the '161 patent, which involve "adjusting" sheath fluid, may present easier questions. While the motions for summary judgment were under advisement, PTAB issued decisions finding the asserted claims of the '912 patent unpatentable, and some of the asserted claims of the '161 patent unpatentable. (Dkt. ##275-1, 277-1.) In motions *in limine*, the parties should brief the import of these decisions on any anticipation or obviousness challenges as to those two patents.

prior invention, the prior art reference . . . must also disclose those elements 'arranged as in the claim.'" *Id.* (quoting *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983)). This means that the prior art must detail all the limitations "arranged or combined in the same way as in the claim." *Id.* at 1370. Thus, "it is not enough that the prior art reference discloses part of the claimed invention, which an ordinary artisan might supplement to make the whole, or that it includes multiple, distinct teachings that the artisan might somehow combine to achieve the claimed invention." *Id.* at 1371.

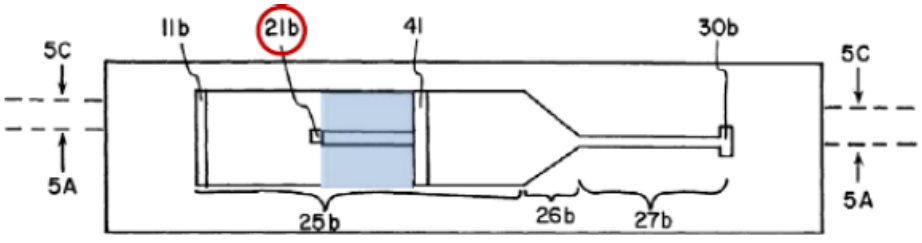
As defendants emphasize, "[h]owever, a reference can anticipate a claim even if it d[oes] not expressly spell out all the limitations arranged or combined as in the claim, if a person of skill in the art, reading the reference, would at once envisage the claimed arrangement or combination." *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d. 1331, 1341 (Fed. Cir. 2016) (first alteration added) (internal citations and quotation marks omitted); *id.* at 1344 ("[A] reference may still anticipate if that reference teaches that the disclosed components or functionalities may be combined and one of skill in the art would be able to implement the combination." (internal citations omitted)); *see also Purdue Pharma L.P. v. Epic Pharma, LLC*, 811 F.3d 1345, 1351 (Fed. Cir. 2016) ("A single prior art reference may anticipate without disclosing a feature of the claimed invention if such feature is necessarily present, or inherent, in that reference." (internal citation omitted)).

Although anticipation is ultimately a question of fact, "it may be decided on summary judgment if the record reveals no genuine dispute of material fact." *Leggett & Platt, Inc. v. VUTEk, Inc.*, 537 F.3d 1349, 1352 (Fed. Cir. 2008) (quoting *Golden Bridge Tech., Inc. v. Nokia, Inc.*, 527 F.3d 1318, 1321 (Fed. Cir. 2008)). Still, "[e]vidence of

invalidity must be clear as well as convincing." *Schumer v. Laboratory Computer Sys.*, Inc., 308 F.3d 1304, 1315 (Fed. Cir. 2002). As such, "[t]ypically, testimony concerning anticipation must be testimony from one skilled in the art and must identify each claim element, state the witnesses' interpretation of the claim element, and explain in detail how each claim element is disclosed in the prior art reference." *Id.* Conclusory statements by experts (or attorneys) are insufficient. *See id.* at 1315-16.

1. Weigl

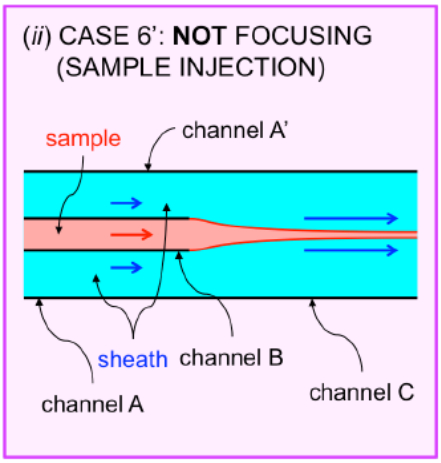
Defendants contend that Weigl discloses focusing in a primary focusing region. Specifically, through their expert Dr. Di Carlo's testimony, defendants argue that Weigl discloses a "first focusing region extended downstream from the sample injection site that can serve as a 'primary focusing region,' as highlighted in the annotated Figure 5B below:"



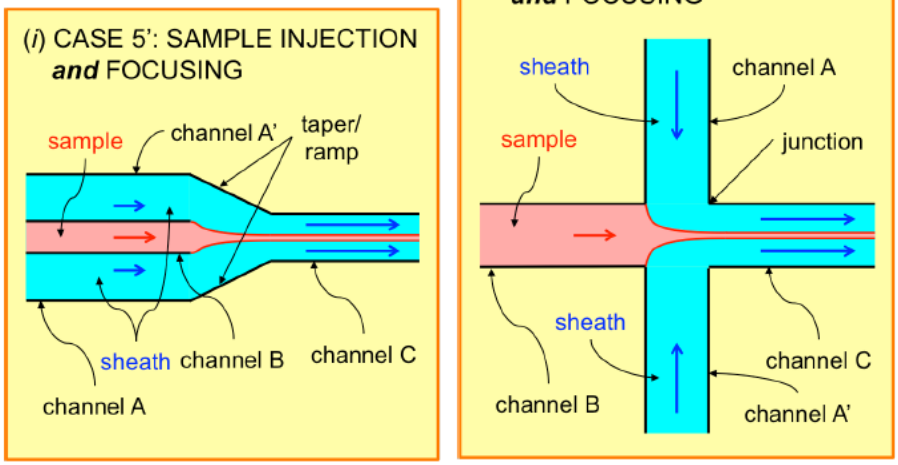
(Defs.' Opening Br. (dkt. #162) 119 (citing Di Carlo Rept. (dkt. #129) ¶ 350; Weigl at Fig. 5B).) Defendants contend that the sample injected at 21b is "surrounded horizontally, i.e., on both sides by the sheath fluid from the first inlet," and, therefore "[t]his focuses the particles away from the left and right sides of the flow channel." (*Id.* (citing Di Carlo Rept. (dkt. #129) ¶ 351).)[18]

[18] Di Carlo also opines that there is focusing from the top wall as well because the sample enters from the bottom of the channel. (Defs.' Opening Br. (dkt. #162) 119 (citing Di Carlo Rept. (dkt. #129) ¶ 352.)

Relying on their expert Dr. Vacca, plaintiffs respond that there is no focusing at this junction, because the sample is merely being injected into the sheath flow, which was disclaimed as previously explained. (Pls.' Opp'n (dkt. #191) 89.) At least facially, this argument has a certain logical appeal. Said another way, because this area lacks a structural change, e.g., a ramp or a taper, or injection of additional sheath fluid, there is no focusing. Indeed, the highlighted portion of the Weigl invention identified by defendants as the primary focusing region or first focusing step, resembles the following image reproduced from Vacca's Rebuttal Report, showing a sample injection which is *not* focused:



(Vacca Rebuttal Rept. (dkt. #131) ¶ 152.) In contrast, Vacca opines that the inclusion of either a taper or ramp or of additional sheath fluid at the sample insertion point *would* satisfy the focusing requirement, as depicted in the two images below:



(*Id.* ¶¶ 149, 152.)

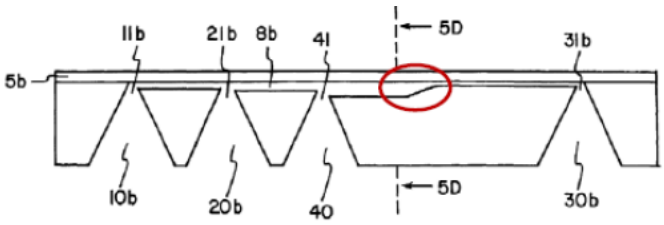
In their reply brief, therefore, defendants point the court to the excerpt from Weigl's specification that provides:

> In FIG. 4B, the upstream portion (**25***a*) is connected to the downstream portion (**27***a*) via the tapered portion (**26***a*). In this embodiment the second inlet is positioned in the upstream portion. It can alternatively be in the tapered portion. It is preferable to position the second inlet in the upstream portion because this allows for greater and more precise horizontal hydrodynamic focusing.

(Weigl at 9:67-10:6.)[19] If the sample inlet was placed in the taper -- depicted in the image above at 26b -- then it appears that there would be focusing. Indeed, the tapering would appear to match the image in Vacca's Case 5', showing a sample injection and focusing because of the placement of a taper/ramp. Arguably, Weigl could then be read to disclose a primary focusing area at (or immediately after) the second inlet, where the sample is inserted.

[19] Di Carlo also mentions this in his rebuttal report, albeit in passing. (Di Carlo Rebuttal Rept. (dkt. #129) ¶ 478.)

Defendants rely on a second sheath fluid inlet injunction (41), which provides for sheath fluid entering from below, to argue that the sheath flow is then focused from a second direction. Alternatively, defendants contend that Weigl also discloses a vertical tapering region (which the Cytonome patents would refer to as a ramp) downstream of sheath fluid inlet (41) that can also constitute a secondary focusing area, as depicted in a side image of Figure 5A below:



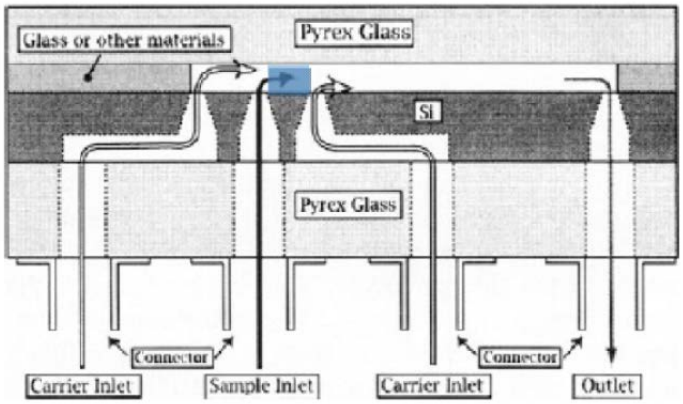
(Defs.' Opening Br. (dkt. #162) 123 (citing Di Carlo Rept. (dkt. #129) ¶ 357); Weigl at Fig. 5A).) Both the insertion of additional sheath fluid from the bottom and the ramp could provide focusing, as Vacca appears to concede in his report. (Vacca Rebuttal Rept. (dkt. #131) ¶ 145 (Case 2b, depicting focusing caused by insertion of sheath fluid from above); *id.* ¶ 153 (Case 1a, depicting focusing cause by a taper or ramp).)

As described above, therefore, there is a solid argument that Weigl discloses two focusing areas or steps, *but* for the fact that: (1) defendants failed to develop fully a theory relying on the taper at the sample inlet to provide focusing at the primary focusing area or first step; *and* (2) Weigl does *not* depict this configuration in the same embodiment as that disclosing a third inlet (41), where additional sheath fluid is injected from below (or where there is a vertical ramp similarly providing focusing from below). Both of these qualifications preclude the court from deciding as a matter of fact on this record that Weigl disclosed the elements of the claim, at least "arranged as in the claim." *Net MoneyIN*, 545

F.3d at 1369 (internal citations and quotation marks omitted). While this anticipation claim may nevertheless succeed at trial -- and, indeed, the court would at least entertain a motion for directed verdict at the appropriate time -- there remain material disputed issues of fact that preclude summary judgment in defendants' favor at this time.

2. Tashiro

Both sides move for summary judgment on defendants' anticipation counterclaim based on Tashiro. Defendants contend that Tashiro discloses "focusing the carrier flow around the left, right, and top of the particles in the sample flow where the first carrier flow meets the sample flow," as depicted in blue below:

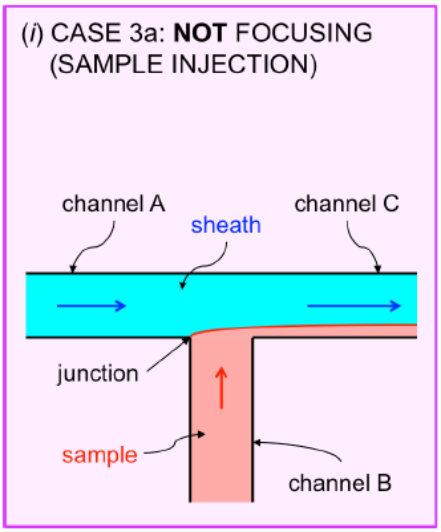


(Defs.' Opening Br. (dkt. #162) 160 (citing Di Carlo Rept. (dkt. #129) ¶¶ 697); Defs.' Reply (dkt. #217) 95.)[20]

As plaintiffs initially point out, however, Tashiro does not mention "focusing" at

[20] Defendants contend that Tashiro's secondary focusing area is at the second carrier inlet, where additional sheath fluid is inserted from the bottom. Plaintiffs principally argue that this cannot be the secondary focusing area because there is no primary focusing area. Still, it appears that the area identified as the secondary focusing region would satisfy plaintiffs' expert Dr. Vacca's depiction of focusing in Case 4, showing additional focusing by injection of sheath fluid. (Vacca Rebuttal Rept. (dkt. #131) ¶ 148.)

all, unlike Weigl and Wada. More fundamentally, at the location *identified by defendants* as the primary focusing area or the first step, plaintiffs argue that Tashiro simply discloses injecting or inserting a sample into a sheath flow. Indeed, relying again on Vacca's depictions, Tashiro appears to disclose Case 3a, a sample injection which does *not* involve focusing:



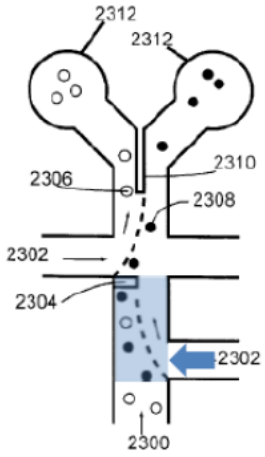
(Vacca Rebuttal Rept. (dkt. #131) ¶ 146.)

Defendants counter that plaintiffs' description of Tashiro would foreclose a finding of focusing in the Cytonome patents themselves: "The primary focusing region of Tashiro identified by Defendants is no more 'merely introducing a sample fluid at a particular position [in] a straight flow passage' than the devices in the Cytonome patents." (Defs.' Reply. (dkt. #217) 96.) However, under the court's construction of "focusing" in the asserted claims of the Cytonome patents, and specifically the court's finding of a prosecution disclaimer, this is a moot point. Moreover, the figures in the Cytonome patents, as depicted above in construing the "direction" terms, disclose tapering at the primary focusing region.

Even so, the court will decline to grant summary judgment to either party because a reasonable fact finder could conclude that Tashiro discloses a structural narrowing at, or immediately after, the sample inlet, which arguably causes focusing at the region identified by defendants as the primary focusing region. (Pls.' Add'l PFOFs (dkt. #188) ¶ 373 (disputing whether Tashiro discloses broadening of the sheath flow channel before or at the sample injection site); *see also* Tashiro (dkt. #166-9) Fig. 3.)

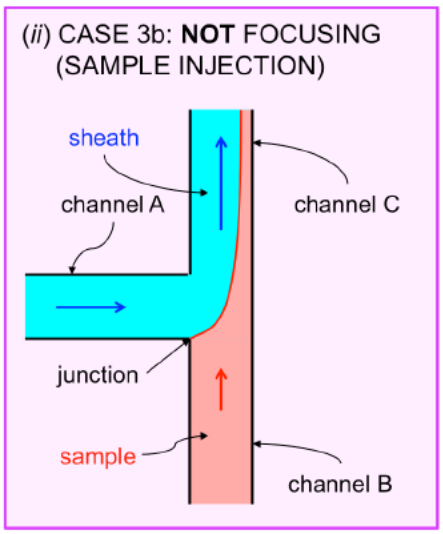
3. Wada

Finally, defendants seek summary judgment on their anticipation claim based on Wada. Specifically, defendants contend that Wada discloses a primary focusing region where "a first microchannel intersects the primary sheath flow channel from the right to introduce additional fluid in the primary sheath flow channel, focusing the sheath fluid around the particles in a first direction, as shown below (with blue arrow showing the direction of focusing:"



(Defs.' Opening Br. (dkt. #162) 193 (citing Di Carlo Rept. (dkt. #129) ¶ 529; Wada (dkt. #169-8) Fig. 23).)

As they did with Tashiro, plaintiffs again argue in response that this area does not disclose focusing, because the region "constitutes mere injection of a sample into a straight flow passage" as depicted in Vacca's report at Case 3B, which shows a sample injection not involving focusing:



(Pls.' Opp'n (dkt. #191) 124 (citing Vacca Rebuttal Rept. (dkt. #131) ¶ 146).)

As with Tashiro, therefore, plaintiffs have established a genuine dispute of material fact as to whether Wada discloses a primary focusing area. Moreover, plaintiffs cast doubt on whether the area identified by defendants as the secondary focusing area focuses the sheath fluid around the particle, or simply directs particles into two output channels. (*Id.* at 125.) For both reasons, the court must also deny defendants' motion as to their anticipation counterclaim based on Wada.

II. Plaintiffs' Motion for Summary Judgment

This then leaves plaintiffs' motion for summary judgment on defendants' assertions of inequitable conduct and breach of contract.[21]

A. Defendants' Inequitable Conduct Defense and Counterclaim

"Inequitable conduct is an equitable defense to patent infringement most appropriately reserved for the court." *Rothman v. Target Corp.*, 556 F.3d 1310, 1322 (Fed. Cir. 2009); *see also Baxter Healthcare Corp. v. Spectramed, Inc.*, 49 F.3d 1575, 1584 (Fed. Cir. 1995) (noting that "inequitable conduct is a matter for the trial judge, and not the jury"). "A party seeking to prove inequitable conduct must show by clear and convincing evidence [1] that the patent applicant made misrepresentations or omissions material to patentability, [2] that he did so with the specific intent to mislead or deceive the PTO, and [3] that deceptive intent was the single most reasonable inference to be drawn from the evidence." *Ohio Willow Wood Co. v. Alps S., LLC*, 813 F.3d 1350, 1357 (Fed. Cir. 2016). As to the first showing, defendants must show "but-for materiality," which means proof that "the PTO would not have allowed the claim had it been aware of the undisclosed prior art." *Therasense, Inc. v. Becton, Dickinson & Co.*, 649 F.3d 1276, 1291 (Fed. Cir. 2011) (*en banc*). However, but-for materiality is not required for "cases of affirmative egregious misconduct," such as "the filing of an unmistakably false affidavit." *Id.* at 1292. The Federal Circuit has determined that such cases satisfy the materiality requirement on their

[21] As indicated above, plaintiffs also moved for summary judgment on a finding that defendants' invalidity defenses and counterclaims based on Tashiro fail as a matter of law. Having addressed this argument above in conjunction with defendants' motion for summary judgment based on anticipation by Tashiro, the court need not address it again.

face. *Id.*

Here, defendants' inequitable conduct defense and counterclaim is premised on two, alleged acts of misconduct: (1) the intentional withholding of four prior art references by the inventors, Dr. Bunner and Dr. Gilbert, each of which defendants maintain anticipate the Cytonome patents; and (2) Dr. Bunner's allegedly "egregious misconduct" of swearing that he "reviewed and understood the claims" during the application process, but then testifying inconsistently at his deposition as to whether he had actually read the claims and understood them.

As to the first allegation, plaintiffs contend at summary judgment that Tashiro does not anticipate the Cytonome patents because it does not disclose focusing. Accordingly, plaintiffs argue, the inventors' failure to disclose this prior art reference could not have been with specific intent. Because this argument only concerns one of the four prior art references, and only the Cytonome claims concerning focusing, this hardly serves as a basis for summary judgment on defendants' assertion of inequitable conduct in plaintiffs' favor. At most, it might narrow defendants' bases for pursuing this claim. As previously noted, however, defendants will face a steep burden in demonstrating that Tashiro discloses a primary focusing region, making their chances of demonstrating materiality with respect to this prior art reference appear limited. However, plaintiffs will still have an opportunity to refine this argument in motions *in limine* or directed verdict.

Plaintiffs also contend that defendants lack clear and convincing evidence of the inventors' specific intent to defraud as to all four pieces of prior art, relying on the inventors' deposition testimony that they viewed the references as cumulative. As an initial

matter, there appears to be no basis for disputing that the inventors were aware of these prior art references. Still, awareness does not by itself prove specific intent to deceive. *Therasense*, 649 F.3d at 1290 ("Proving that the applicant knew of a reference, should have known of its materiality, and decided not to submit it to the PTO does not prove specific intent to deceive."). Defendants also proffer evidence that the inventors were motivated by monetary gain in seeking the Cytonome patents, but this would arguably cover most, if not all, patent applicants, and is not enough to form a sufficient basis to infer specific intent. Accordingly, defendants' actual evidence of intent appears limited. Nonetheless, the court will deny plaintiffs' motion for summary judgment, finding that these types of determinations are best made at trial after the benefit of hearing all the testimony and assessing the credibility of the named inventors. *See Key Pharm. v. Hercon Labs. Corp.*, 161 F.3d 709, 719 (Fed. Cir. 1998) (acknowledging that "the finding on intent in particular depended heavily on the presentation of evidence and witness testimony at trial" and that "[t]he trial court was able to hear these matters first hand and assess witness credibility").[22] Moreover, the trial will also touch on whether Tashiro anticipates the Cytonome patents, and, therefore, help determine whether the failure to disclose that prior art reference was material.

As for defendants' proof of affirmative egregious acts, defendants' sole evidence is Bunner's contemporary affidavit supporting the patent application to the effect that he understood the claims and his recent deposition testimony, which admittedly casts some

[22] Because defendants' inequitable conduct claim is a question for the court, *see Rothman*, 556 F.3d at 1322, the court will hear this testimony outside of the presence of the jury, while the jury is deliberating on liability.

doubt as to whether he read the claims and the extent of his understanding at the time of application. Here, too, defendants' evidence is thin given Bunner's inconsistent deposition testimony, which falls well short of demonstrating an "egregious act." Nonetheless, the court will also be better equipped after hearing Bunner's testimony at trial to decide whether he lied when he signed the affidavit supporting the patent application. Accordingly, the court will deny plaintiffs' motion for summary judgment on defendants' inequitable conduct counterclaim, while noting that the evidence presented at summary judgment suggests defendants will fall short of the high bar required for such a finding.

B. Defendant ABS's Breach of Contract Counterclaim

Finally, plaintiff ST seeks summary judgment on defendant ABS's breach of contract counterclaim, based on defendant ST's alleged failure to provide sexed semen straws satisfying the 85% purity requirement in the 2012 Agreement. ST argues persuasively that the Agreement is "ambiguous as to the specific methodology to be employed when testing purity," and that ambiguity should be "resolved by the parties' undisputed course of performance. Here, it is undisputed fact that the sole, agreed-upon method for assessing purity throughout the five-year life of the Agreement is ST's "flow cytometry reanalysis." (Pls.' Opening Br. (dkt. #167) 38-39.)

To begin, the parties agree that Texas law governs ABS's breach of contract claim. "Whether a contract is ambiguous is a 'question of law for the court to decide by looking at the contract as a whole in light of the circumstances present when the contract was entered.'" *Amigo Broad., LP v. Spanish Broad. Sys., Inc.*, 521 F.3d 472, 488 (5th Cir. 2008) (quoting *Coker v. Coker*, 650 S.W.2d 391, 394 (Tex. 1983)). "A latent ambiguity exists if

the meaning of language used in a written agreement becomes uncertain when applied to the *subject matter* of the contract." *Id.* (internal citation and quotation marks omitted). "[I]n determining whether a latent ambiguity exists, courts may examine surrounding circumstances and the subject matter of the contract." *Id.* (internal citations and quotation marks omitted).

ST maintains that the contract is ambiguous as to the purity-method measurement, and analogizes this ambiguity to that at issue in *Donahue v. Bowles, Troy, Donahue, Johnson, Inc.*, 949 S.W.2d 746 (Tex. App. 1997). In *Donahue*, the contract provided that the value of shares would be determined by a third-party appraiser. *Id.* at 753. When appraising the shares, the third party, however, prepared two valuations, the later of which incorporated new information received after the first valuation was completed. *Id.* Accordingly, the Texas Court of Appeals found the presence of a latent ambiguity because the contract was silent on when the valuation was to be completed and whether the shares could be reappraised in light of new information. *Id.*

In response, ABS argues that there is no ambiguity. More specifically, as alluded to above in the facts section, ABS contends that "actual" purity does not change -- even if there is some variance in any given measurement -- and that the contract unambiguously requires that ST deliver straws that are at least 85% of the desired sex. (Defs.' Opp'n (dkt. #186) 36.) From this, ABS distinguishes *Donahue*, arguing that in the case of *Donahue*, there was "no way to evaluate compliance without first determining . . . which evaluation is '*the* valuation,'" while here the standard for compliance in the 2012 Agreement is clear. (*Id.*)

ABS's attempt to rely on an "actual" purity requirement separate from a measurement of purity is unworkable at best and disingenuous at worst. How are the parties to determine compliance other than by relying on a method of measuring purity? Moreover, ABS does not dispute that even at the time the parties entered into the 2012 Agreement, different purity-measuring techniques could produce different, and potentially conflicting, results. As such, the court agrees with ST that the Agreement's silence as to the appropriate method or technique for measuring purity is a classic example of a latent ambiguity in a contract.

As ABS points out -- and as ST acknowledges in its briefing -- the presence of a latent ambiguity typically requires a jury to resolve the ambiguity, determining the parties' intent. *See, e.g.*, *Reilly v. Rangers Mgmt., Inc.*, 727 S.W.2d 527, 529 (Tex. 1987) ("When a contract contains an ambiguity, the granting of a motion for summary judgment is improper because the interpretation of the instrument is a question of fact for the jury."). Nevertheless, ST points out that the parties' course of performance can be considered as parol evidence in determining the parties' intent, which it argues here supports a finding that the parties intended for purity to be measured by ST's flow cytometer reanalysis. (Defs.' Opening Br. (dkt. #167) 41-42.)

On this record, the court agrees that ST's consistent use of this one method to measure purity during the course of the 2012 Agreement (and predating it), coupled with ABS's acceptance of the sexed semen straws without raising any concern or question about purity or the method for measurement for the majority of the contract supports a finding that the parties intended for the flow cytometer reanalysis to be used to measure purity.

Even more compelling for the court is ABS's reliance on this measurement during the *entire* life of the Agreement in turning around and selling the same straws to its own customers, relying on ST's representation of purity. On this record, the court finds that no reasonable jury would find such longstanding acceptance of performance did not establish the proper measure of purity under the 2012 Agreement.

ABS does raise a separate fact issue as to whether the actual purity measurements under the flow cytometry reanalysis method satisfied the 85% compliance standard. More specifically, as detailed above, ABS has raised a fact issue as to whether ST's testing was "fudged" to demonstrate compliance. There are holes in this evidence, the largest being that it is hard to discern why a test used without incident for almost the entire five year life of the 2012 Agreement would suddenly deteriorate in the last few batches, but that is what ABS's evidence purports to show, and a reasonable jury might believe that ST decided to cut corners at the end of a deteriorating business relationship, just as jurors might believe ABS conjured up this latent quality concern as leverage in the parties' bargaining dispute. Regardless, this will be an issue for the jury to sort out.

ST also seeks summary judgment on the basis that the breach did not cause ABS injury. Under Texas law, unlike Wisconsin law, injury *is* an element of a breach of contract claim. *See Wicker v. Seterus, Inc.*, No. EP-17-CV-99-DB, 2018 WL 4856771, at *13 (W.D. Tex. Oct. 4, 2018) ("The elements of a breach of contract claim in Texas are: (1) there is a valid and enforceable contract; (2) the plaintiff performed, tendered performance or was excused from performing; (3) the defendant breached the contract; and (4) the defendant's breach caused the plaintiff's injury." (citing *USAA Tex. Lyods Co. v. Menchaca*, 545 S.W.3d

479, 501 n.21 (Tex. 2018)). In response, however, ABS argues that it *was* injured by overpaying for sexed semen straws that did not meet the purity requirement, and can pursue a "benefit-of-the-bargain" damages theory under Texas law based on the difference in price between the "higher-purity sorting it was promised under the 2012 Agreement and the lower-purity sorting it actually received." (Defs.' Opp'n (dkt. #186) 47.) ST rightly points out the gaping hole in this theory of damages fails given ABS's admission to selling all of the allegedly noncompliant straws in the normal course of business, presumably at the same or higher premium relying on ST's representation of purity, either by selling them to ABS customers or by use in its own business. While this is compelling evidence that ABS was *not* injured by the breach, and suffered no damages, a reasonable jury *might* find otherwise, in light of ABS's evidence that its customers complained of the purity of ST-sorted product and ST allowed for discounted pricing or rebates if straws were shown to be less pure than represented. (*Id.* at 48; *see also* Defs.' Add'l PFOFs (dkt. #188) ¶¶ 138-39.)[23]

III. Trial Schedule

PTAB has now issued two final decisions with respect to the invalidity challenges of the '161 and '912 patents. (Dkt. ##275-1, 277-1.) Moreover, the Seventh Circuit has

[23] While this evidence may be deemed relevant to injury, ABS has waived any damages claim based on injury to reputation or lost customers. (Defs.' Opp'n (dkt. #186) 46 n.13.) ST also challenges any damage theory based on ABS recouping a liquidated damages payment to ST for ABS's failure to purchase a required number of straws. The court need not reach this argument, however, finding an adequate basis for a jury finding injury and awarded damages under a "benefit-of-the-bargain" damages theory. Even so, the extent of ABS's claim to damages will be cabined by its Rule 26 disclosures and any evidence that ABS actually broke even (or even profited) by reselling lower quality straws. Indeed, both issues may be the proper subject of a motion *in limine*.

issued its mandate in *ABS I*, No. 14-cv-503 ('503 dkt. # 885), and the parties have stipulated to the retrial proceeding to the same judge ('503 dkt. #886). As such, this case and *ABS I* are ready to proceed to a consolidated trial, commencing September 3, 2019. The court will hold a scheduling conference on May 13, 2019, at 10:00 a.m. The parties are directed to meet and confer in advance of that hearing to consider any ways to streamline matters for the jury at trial.

ORDER

IT IS ORDERED that:

1) The reserved portions of defendants' motion for partial summary judgment (dkt. #156) is GRANTED IN PART AND DENIED IN PART. Defendants' motion for a finding of noninfringement is granted as to (a) the '161 and '912 patents and (b) some of plaintiffs' infringement theories as to the '476 and '309 patents. The motion is denied as to plaintiffs' remaining infringement theories as to the '476 and '309 patents. The motion also is denied as to defendants' invalidity counterclaims.

2) Plaintiffs' motion for partial summary judgment (dkt. #163) is DENIED.

3) This case and *ABS v. Inguran, LLC*, No. 14-cv-503, are consolidated for purposes of trial, commencing September 3, 2019.

4) The court will hold a scheduling conference May 13, 2019, at 10:00 a.m. Counsel for plaintiff to establish call to chambers at 608-264-5087.

Entered this 29th day of April, 2019.

BY THE COURT:

/s/

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WILLIAM M. CONLEY
District Judge